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ICFAS2016

Book of Abstracts

Editors
Muhammet Kurulay
Elif Segah Öztaş
“In the name of Allah, the Most Compassionate and the Most Merciful”. Thus first of all we are very grateful to Allah (s.w.t) that provided the life to meet all of us during this memorable occasion and all praise to be upon Muhammad (s.a.w) who is guidance for the entire universe.

It is my great pleasure that I welcome you to the International Congress on Fundamental and Applied Sciences 2016 (ICFAS2016). I feel truly honored to have the opportunity of addressing you for several reasons.

As chairman of this international conference, one of the reasons that I am honored, Yildiz Technical University organizing this activity.

ICFAS 2016 provides an ideal academic platform for researchers to present the latest research and emerging findings of Fundamental and Applied Sciences on Mathematics, Physics, Chemistry, Biology and Statistics. The conference seeks to contribute to presenting novel research results in all aspects of Fundamental and Applied Sciences.

The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Fundamental and Applied Sciences. It also provides the premier interdisciplinary forum for scientists, researchers, and practitioners to present their latest research results, ideas, developments, and applications in all areas of Fundamental and Applied Sciences. The conference brings together leading academic scientists, researchers and scholars in the domain of interest from around the world.

All of them are distinguished in their own areas of specialty and they will discuss wide-ranging issues, especially in Mathematics all related in the broad spectrum of:


This conference is an achievement of international cooperation we continuously strive to carry out and nourish. Therefore, on behalf of chairman of this conference and my own, I would particularly like to thank:

Prof. Dr. Shaher Momani from The University of Jordan,
Prof. Dr. Omer Akin from TOBB University of Economy & Technology,
Prof. Dr. Muhammed Uludag from Galatasaray University,
Prof. Dr. Masood Khalique from North-West University.
I would also like to thank the persons who are involved in the scientific and organizational committee of the conference.

Thank you, to each and every one of you, for taking the time to be part of this event and for honoring it with your presence.

I would like to extend my best wishes to all of you with a hope that you go back with new and more powerful insights, and with new networks renewed or extended.

Best wishes for an enjoyable and memorable conference!

Muhammet Kurulay

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Participants
<table>
<thead>
<tr>
<th>Name</th>
<th>Surname</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbas Najati</td>
<td></td>
<td><a href="mailto:a.nejati@yahoo.com">a.nejati@yahoo.com</a></td>
</tr>
<tr>
<td>Abdelkrim Merzougui</td>
<td></td>
<td><a href="mailto:shamdadz@yahoo.fr">shamdadz@yahoo.fr</a></td>
</tr>
<tr>
<td>Abdullah Murat Aksoy</td>
<td></td>
<td><a href="mailto:amurataksoy@gazi.edu.tr">amurataksoy@gazi.edu.tr</a></td>
</tr>
<tr>
<td>Abedel-Karrem Alomari</td>
<td></td>
<td><a href="mailto:abdomari2008@yahoo.com">abdomari2008@yahoo.com</a></td>
</tr>
<tr>
<td>Adem C. Cevikel</td>
<td></td>
<td><a href="mailto:acevikel@yildiz.edu.tr">acevikel@yildiz.edu.tr</a></td>
</tr>
<tr>
<td>Adem Kilicman</td>
<td></td>
<td><a href="mailto:akilic@upm.edu.my">akilic@upm.edu.my</a></td>
</tr>
<tr>
<td>Ahmet Bakkaloglu</td>
<td></td>
<td><a href="mailto:ahmetbakkaloglu@gmail.com">ahmetbakkaloglu@gmail.com</a></td>
</tr>
<tr>
<td>Ahmet Bekir</td>
<td></td>
<td><a href="mailto:abekir@ogu.edu.tr">abekir@ogu.edu.tr</a></td>
</tr>
<tr>
<td>Ahmet Celebi</td>
<td></td>
<td><a href="mailto:ahamet@sakarya.edu.tr">ahamet@sakarya.edu.tr</a></td>
</tr>
<tr>
<td>Ahmet Dasdemir</td>
<td></td>
<td><a href="mailto:ahmetdasdemir37@gmail.com">ahmetdasdemir37@gmail.com</a></td>
</tr>
<tr>
<td>Ahmet Hamdi Avsar</td>
<td></td>
<td><a href="mailto:ahmet.avsar@balikesir.edu.tr">ahmet.avsar@balikesir.edu.tr</a></td>
</tr>
<tr>
<td>Ahmet Lutfi Ugur</td>
<td></td>
<td><a href="mailto:alugur@comu.edu.tr">alugur@comu.edu.tr</a></td>
</tr>
<tr>
<td>Ali Aydin</td>
<td></td>
<td><a href="mailto:aiyadin.bio@gmail.com">aiyadin.bio@gmail.com</a></td>
</tr>
<tr>
<td>Ali Erdogmus</td>
<td></td>
<td><a href="mailto:erdogmusali@hotmail.com">erdogmusali@hotmail.com</a></td>
</tr>
<tr>
<td>Ammar Boukhemis</td>
<td></td>
<td><a href="mailto:aboukhemis@yahoo.com">aboukhemis@yahoo.com</a></td>
</tr>
<tr>
<td>Arzu Akgül</td>
<td></td>
<td><a href="mailto:akgulcagila@hotmail.com">akgulcagila@hotmail.com</a></td>
</tr>
<tr>
<td>Aysegul Bayram</td>
<td></td>
<td><a href="mailto:aaysegulbayram@gmail.com">aaysegulbayram@gmail.com</a></td>
</tr>
<tr>
<td>Aysel Koc Demir</td>
<td></td>
<td><a href="mailto:akocaysel@yahoo.com">akocaysel@yahoo.com</a></td>
</tr>
<tr>
<td>Aziz Boulbot</td>
<td></td>
<td><a href="mailto:aziz.boulbot@usmba.ac.ma">aziz.boulbot@usmba.ac.ma</a></td>
</tr>
<tr>
<td>Banan Maayah</td>
<td></td>
<td><a href="mailto:bnan_m3ay3ah@yahoo.com">bnan_m3ay3ah@yahoo.com</a></td>
</tr>
<tr>
<td>Barbaros Nalbantoglu</td>
<td></td>
<td><a href="mailto:barbaros@yildiz.edu.tr">barbaros@yildiz.edu.tr</a></td>
</tr>
<tr>
<td>Benabderrahmane Benyattou</td>
<td></td>
<td><a href="mailto:bbenyattou@yahoo.com">bbenyattou@yahoo.com</a></td>
</tr>
<tr>
<td>Bernal Kilic</td>
<td></td>
<td><a href="mailto:bkclc@windowslive.com">bkclc@windowslive.com</a></td>
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<tr>
<td>Betul Akin</td>
<td></td>
<td><a href="mailto:bortaca@yahoo.com">bortaca@yahoo.com</a></td>
</tr>
<tr>
<td>Biroud Kheireddine</td>
<td></td>
<td><a href="mailto:kh_biroud@yahoo.fr">kh_biroud@yahoo.fr</a></td>
</tr>
<tr>
<td>Brahim Khodja</td>
<td></td>
<td><a href="mailto:brahim.khodja@univ-annaba.org">brahim.khodja@univ-annaba.org</a></td>
</tr>
<tr>
<td>Burcin Dogan</td>
<td></td>
<td><a href="mailto:brcndogan@gmail.com">brcndogan@gmail.com</a></td>
</tr>
<tr>
<td>Burcu Efe</td>
<td></td>
<td><a href="mailto:efeburcu@outlook.com.tr">efeburcu@outlook.com.tr</a></td>
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<tr>
<td>Burcu Gurbuz</td>
<td></td>
<td><a href="mailto:brcu_grbz@yahoo.com">brcu_grbz@yahoo.com</a></td>
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<tr>
<td>Canan Onac</td>
<td></td>
<td><a href="mailto:canan.onac@hotmail.com">canan.onac@hotmail.com</a></td>
</tr>
<tr>
<td>Chaudry Masood Khalique</td>
<td></td>
<td><a href="mailto:masood.khalique@nwu.ac.za">masood.khalique@nwu.ac.za</a></td>
</tr>
<tr>
<td>Cisem Oz</td>
<td></td>
<td><a href="mailto:cisemozz@gmail.com">cisemozz@gmail.com</a></td>
</tr>
<tr>
<td>Deniz Akin Sahbaz</td>
<td></td>
<td><a href="mailto:denizakin@aku.edu.tr">denizakin@aku.edu.tr</a></td>
</tr>
<tr>
<td>Deniz Sonmez</td>
<td></td>
<td><a href="mailto:dznzguel@hotmail.com">dznzguel@hotmail.com</a></td>
</tr>
<tr>
<td>Dilmi Mourad</td>
<td></td>
<td><a href="mailto:mouraddil@yahoo.fr">mouraddil@yahoo.fr</a></td>
</tr>
<tr>
<td>Dogan Cirmi</td>
<td></td>
<td><a href="mailto:dogancirmi@hotmail.com">dogancirmi@hotmail.com</a></td>
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<tr>
<td>Dogan Kaya</td>
<td></td>
<td><a href="mailto:dogank@ticaret.edu.tr">dogank@ticaret.edu.tr</a></td>
</tr>
<tr>
<td>Ekin Deliktas</td>
<td></td>
<td><a href="mailto:edeliktas@itu.edu.tr">edeliktas@itu.edu.tr</a></td>
</tr>
<tr>
<td>Elif Caliskan Salihi</td>
<td></td>
<td><a href="mailto:caliskanelif@gmail.com">caliskanelif@gmail.com</a></td>
</tr>
<tr>
<td>Elif Ozel Ay</td>
<td></td>
<td><a href="mailto:elif-ozel@hotmail.com">elif-ozel@hotmail.com</a></td>
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<tr>
<td>Elif Segah Oztas</td>
<td></td>
<td><a href="mailto:elifsegahoztas@gmail.com">elifsegahoztas@gmail.com</a></td>
</tr>
<tr>
<td>Eman Alshemas</td>
<td></td>
<td><a href="mailto:emanalshemas@gmail.com">emanalshemas@gmail.com</a></td>
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<tr>
<td>Enes Yavuz</td>
<td><a href="mailto:enes.yavuz@cbu.edu.tr">enes.yavuz@cbu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Erol Kam</td>
<td><a href="mailto:erolkam@hotmail.com">erolkam@hotmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Esma Ulusoy</td>
<td><a href="mailto:eresmet@gmail.com">eresmet@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>F. Muğe Sakar</td>
<td><a href="mailto:mugesakar@hotmail.com">mugesakar@hotmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Fadime Yıldırım</td>
<td><a href="mailto:fadimeyildirim42konya@outlook.com">fadimeyildirim42konya@outlook.com</a></td>
<td></td>
</tr>
<tr>
<td>Fatih Demirkale</td>
<td><a href="mailto:fatihd@yildiz.edu.tr">fatihd@yildiz.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Fatma Aytan</td>
<td><a href="mailto:faytank@hotmail.com">faytank@hotmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Fatma Kosovali Cavus</td>
<td><a href="mailto:fatmacavus@halic.edu.tr">fatmacavus@halic.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Feda İlhan</td>
<td><a href="mailto:direnfeda@gmail.com">direnfeda@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Fernane Khairieeddine</td>
<td><a href="mailto:kfermane@yahoo.fr">kfermane@yahoo.fr</a></td>
<td></td>
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<tr>
<td>Frekh Taallah</td>
<td><a href="mailto:frekh2003@yahoo.fr">frekh2003@yahoo.fr</a></td>
<td></td>
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<tr>
<td>Fuat Usta</td>
<td><a href="mailto:fuatusta@duzce.edu.tr">fuatusta@duzce.edu.tr</a></td>
<td></td>
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<tr>
<td>Gamze Elmas</td>
<td><a href="mailto:gegemen@ankara.edu.tr">gegemen@ankara.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Goknur Yasa Atmaca</td>
<td><a href="mailto:goknuryasa@gmail.com">goknuryasa@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Gozde Yaylali</td>
<td><a href="mailto:gozdeyaylali@mu.edu.tr">gozdeyaylali@mu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Guldem Yıldız</td>
<td><a href="mailto:guldem.yildiz@nigde.edu.tr">guldem.yildiz@nigde.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Gural Aydin</td>
<td><a href="mailto:guralaydin@gmail.com">guralaydin@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Gülşah Köse</td>
<td><a href="mailto:mertbal@yildiz.edu.tr">mertbal@yildiz.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Hamid Benseridi</td>
<td><a href="mailto:m_benseridi@yahoo.fr">m_benseridi@yahoo.fr</a></td>
<td></td>
</tr>
<tr>
<td>Handan Tanyıldızı</td>
<td><a href="mailto:handan.tanyildizi@kemerburgaz.edu.tr">handan.tanyildizi@kemerburgaz.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Hasan Tuncay Özçelik</td>
<td><a href="mailto:tuncay_ozcelik@yahoo.com">tuncay_ozcelik@yahoo.com</a></td>
<td></td>
</tr>
<tr>
<td>Hasan Yakın</td>
<td><a href="mailto:hasany@omu.edu.tr">hasany@omu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Hatice Gulsun Akay</td>
<td><a href="mailto:hgulsun@ogu.edu.tr">hgulsun@ogu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Hilal Medet Albeyoğlu</td>
<td><a href="mailto:hilalmedet@gmail.com">hilalmedet@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>İlim Kisi</td>
<td><a href="mailto:ilim.ayvaz@kocaeli.edu.tr">ilim.ayvaz@kocaeli.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>İrem Cay</td>
<td><a href="mailto:irem.atac@kocaeli.edu.tr">irem.atac@kocaeli.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>İsil Acık Demirci</td>
<td><a href="mailto:isilacik@yahoo.com">isilacik@yahoo.com</a></td>
<td></td>
</tr>
<tr>
<td>伊斯mail Aydoğdu</td>
<td><a href="mailto:ismailaydogdu@windowslive.com">ismailaydogdu@windowslive.com</a></td>
<td></td>
</tr>
<tr>
<td>İsmail Kocacaliskan</td>
<td><a href="mailto:ikocacaliskan@gmail.com">ikocacaliskan@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>İsmail Yenilmez</td>
<td><a href="mailto:ismailyenilmez@anadolu.edu.tr">ismailyenilmez@anadolu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>İrem Ergin</td>
<td><a href="mailto:irem.ergin@mta.gov.tr">irem.ergin@mta.gov.tr</a></td>
<td></td>
</tr>
<tr>
<td>İshak Aydin</td>
<td><a href="mailto:ishakaydin@yandex.com">ishakaydin@yandex.com</a></td>
<td></td>
</tr>
<tr>
<td>Kadir Turhan</td>
<td><a href="mailto:turhankadir@yahoo.com">turhankadir@yahoo.com</a></td>
<td></td>
</tr>
<tr>
<td>Khairul Anuar Mohd. Nayan</td>
<td><a href="mailto:kamn56@gmail.com">kamn56@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Khouni Yassine</td>
<td><a href="mailto:yacinespoire@yahoo.fr">yacinespoire@yahoo.fr</a></td>
<td></td>
</tr>
<tr>
<td>Lamine Nisse</td>
<td><a href="mailto:laminisse@gmail.com">laminisse@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Lamyaa Almashhadani</td>
<td><a href="mailto:lamar_math@yahoo.com">lamar_math@yahoo.com</a></td>
<td></td>
</tr>
<tr>
<td>Lijun Zhang</td>
<td><a href="mailto:li-jun0608@163.com">li-jun0608@163.com</a></td>
<td></td>
</tr>
<tr>
<td>M. Fatih Canbolat</td>
<td><a href="mailto:fatihcanbolat@sdu.edu.tr">fatihcanbolat@sdu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Mehmet Emin Koroglu</td>
<td><a href="mailto:sadecesad@gmail.com">sadecesad@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Mehmet Eyüp Kırıya</td>
<td><a href="mailto:kiris@aku.edu.tr">kiris@aku.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Mehmet Fatih Karaaslan</td>
<td><a href="mailto:mfatih@yildiz.edu.tr">mfatih@yildiz.edu.tr</a></td>
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<tr>
<td>Mehmet Salih Ağırtaş</td>
<td><a href="mailto:salihagirtas@hotmail.com">salihagirtas@hotmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Mehmet Yavuz</td>
<td><a href="mailto:mehmetyavuz@konya.edu.tr">mehmetyavuz@konya.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Melike Arslan</td>
<td><a href="mailto:melikearslan92@gmail.com">melikearslan92@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Melike Kaplan</td>
<td><a href="mailto:mkaplan@ogu.edu.tr">mkaplan@ogu.edu.tr</a></td>
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<tr>
<td>Melis Zorsahin Gorgulu</td>
<td><a href="mailto:mzorsahin@ogu.edu.tr">mzorsahin@ogu.edu.tr</a></td>
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<td>Meltem Uzun</td>
<td><a href="mailto:uzunn.meltem@gmail.com">uzunn.meltem@gmail.com</a></td>
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<tr>
<td>Meral Yaşar</td>
<td><a href="mailto:myasar@nigde.edu.tr">myasar@nigde.edu.tr</a></td>
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<tr>
<td>Merve Bulut Yılıgör</td>
<td><a href="mailto:mbyilgor@hotmail.com">mbyilgor@hotmail.com</a></td>
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<td>Merve Cakmak</td>
<td><a href="mailto:t_sidim@yahoo.com">t_sidim@yahoo.com</a></td>
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<td>Merve İlkhan</td>
<td><a href="mailto:merveilkhan@gmail.com">merveilkhan@gmail.com</a></td>
<td></td>
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<tr>
<td>Messaouda Boukhemis</td>
<td><a href="mailto:mesboukhemis@yahoo.fr">mesboukhemis@yahoo.fr</a></td>
<td></td>
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<tr>
<td>Mine Kucak</td>
<td><a href="mailto:mpeksoy@yildiz.edu.tr">mpeksoy@yildiz.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Mirsat Yesiltepe</td>
<td><a href="mailto:mirsatyesiltepe@hotmail.com">mirsatyesiltepe@hotmail.com</a></td>
<td></td>
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<tr>
<td>Mohammad Al-Jamal</td>
<td><a href="mailto:mfaljamal@yu.edu.jo">mfaljamal@yu.edu.jo</a></td>
<td></td>
</tr>
<tr>
<td>Mohammad Bagher Moghimi</td>
<td><a href="mailto:moghimi@uma.ac.ir">moghimi@uma.ac.ir</a></td>
<td></td>
</tr>
<tr>
<td>Mohmad A. Shakhatreh</td>
<td><a href="mailto:mali@yu.edu.jo">mali@yu.edu.jo</a></td>
<td></td>
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<tr>
<td>Muhammed Uludağ</td>
<td><a href="mailto:muhammed.uludag@gmail.com">muhammed.uludag@gmail.com</a></td>
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<tr>
<td>Muhammet Ali Okur</td>
<td><a href="mailto:mali.okur2@gmail.com">mali.okur2@gmail.com</a></td>
<td></td>
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<tr>
<td>Muhammet Arıcı</td>
<td><a href="mailto:muarici@yildiz.edu.tr">muarici@yildiz.edu.tr</a></td>
<td></td>
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<tr>
<td>Muhammet Candan</td>
<td><a href="mailto:mcandan@comu.edu.tr">mcandan@comu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Muhammet Kurulay</td>
<td><a href="mailto:mkurulay@yildiz.edu.tr">mkurulay@yildiz.edu.tr</a></td>
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<tr>
<td>Muhsin Arslan</td>
<td><a href="mailto:muhsin11@gmail.com">muhsin11@gmail.com</a></td>
<td></td>
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<tr>
<td>Murat Alan</td>
<td><a href="mailto:alan@yildiz.edu.tr">alan@yildiz.edu.tr</a></td>
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<tr>
<td>Murat Bekar</td>
<td><a href="mailto:mbekar@konya.edu.tr">mbekar@konya.edu.tr</a></td>
<td></td>
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<tr>
<td>Muttalip Ozavsar</td>
<td><a href="mailto:mozavsar@yildiz.edu.tr">mozavsar@yildiz.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Nadjib Boussetila</td>
<td><a href="mailto:n.boussetila@gmail.com">n.boussetila@gmail.com</a></td>
<td></td>
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<tr>
<td>Naser Zamani</td>
<td><a href="mailto:naserzaka@yahoo.com">naserzaka@yahoo.com</a></td>
<td></td>
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<tr>
<td>Nehari Mohamed</td>
<td><a href="mailto:nehari_72@yahoo.fr">nehari_72@yahoo.fr</a></td>
<td></td>
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<tr>
<td>Omer Akin</td>
<td><a href="mailto:omerakin@etu.edu.tr">omerakin@etu.edu.tr</a></td>
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<tr>
<td>Omer Firat</td>
<td><a href="mailto:ofirat27@gmail.com">ofirat27@gmail.com</a></td>
<td></td>
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<tr>
<td>Onur Kılınç</td>
<td><a href="mailto:onur_kilinc@anadolu.edu.tr">onur_kilinc@anadolu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Osman Çakmak</td>
<td>ocakmak@gelişim.edu.tr</td>
<td></td>
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<tr>
<td>Oya Mert</td>
<td><a href="mailto:oya.mert@kemerburgaz.edu.tr">oya.mert@kemerburgaz.edu.tr</a></td>
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</tr>
<tr>
<td>Özge Koyun</td>
<td><a href="mailto:ozgekyn34@gmail.com">ozgekyn34@gmail.com</a></td>
<td></td>
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<tr>
<td>Ozgur Ege</td>
<td><a href="mailto:ozgur.ege@cbu.edu.tr">ozgur.ege@cbu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Ozlem Orhan</td>
<td><a href="mailto:orhanozlem@itu.edu.tr">orhanozlem@itu.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Oznur Oztunc Kaymak</td>
<td><a href="mailto:oznr83@gmail.com">oznr83@gmail.com</a></td>
<td></td>
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<tr>
<td>Ömer Polat</td>
<td><a href="mailto:omer.polat@eng.bau.edu.tr">omer.polat@eng.bau.edu.tr</a></td>
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<tr>
<td>Pınar Acar Bozkurt</td>
<td><a href="mailto:p3acar@hotmail.com">p3acar@hotmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Rabia Aktas</td>
<td><a href="mailto:raktas@science.ankara.edu.tr">raktas@science.ankara.edu.tr</a></td>
<td></td>
</tr>
<tr>
<td>Rukan Suna Karatekin</td>
<td><a href="mailto:rukansuna@hotmail.com">rukansuna@hotmail.com</a></td>
<td></td>
</tr>
<tr>
<td>Salah Badraoui</td>
<td><a href="mailto:badraoui.salah@univ-guelma.dz">badraoui.salah@univ-guelma.dz</a></td>
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<table>
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<tr>
<td>Samia Bushnaq</td>
<td><a href="mailto:s.bushnaq@psut.edu.jo">s.bushnaq@psut.edu.jo</a></td>
</tr>
<tr>
<td>Segni Sami</td>
<td><a href="mailto:segnianis@gmail.com">segnianis@gmail.com</a></td>
</tr>
<tr>
<td>Semih Gorduk</td>
<td><a href="mailto:semih_grdk@hotmail.com">semih_grdk@hotmail.com</a></td>
</tr>
<tr>
<td>Sezgin Büyükkütük</td>
<td><a href="mailto:sezgin.buyukkutuk@kocaeli.edu.tr">sezgin.buyukkutuk@kocaeli.edu.tr</a></td>
</tr>
<tr>
<td>Shaher Momani</td>
<td><a href="mailto:s.momani@ju.edu.jo">s.momani@ju.edu.jo</a></td>
</tr>
<tr>
<td>Sibel Eken Korkut</td>
<td><a href="mailto:sibeleken@gmail.com">sibeleken@gmail.com</a></td>
</tr>
<tr>
<td>Sibel Koparal</td>
<td><a href="mailto:sibelkoparal1@gmail.com">sibelkoparal1@gmail.com</a></td>
</tr>
<tr>
<td>Sinan Ozturk</td>
<td><a href="mailto:suleymansinan.ozturk@tofas.com.tr">suleymansinan.ozturk@tofas.com.tr</a></td>
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<tr>
<td>Smail Kelaiaia</td>
<td><a href="mailto:kelaiaiasmail@yahoo.fr">kelaiaiasmail@yahoo.fr</a></td>
</tr>
<tr>
<td>Suleyman Adiyaman</td>
<td><a href="mailto:suleyman.adiyaman@hotmail.com">suleyman.adiyaman@hotmail.com</a></td>
</tr>
<tr>
<td>Sultan Cansu Gonenc</td>
<td><a href="mailto:cansu.gonenc@gmail.com">cansu.gonenc@gmail.com</a></td>
</tr>
<tr>
<td>Sumeysa Bedir</td>
<td><a href="mailto:smyrbdr@gmail.com">smyrbdr@gmail.com</a></td>
</tr>
<tr>
<td>Şeyda Kaya</td>
<td><a href="mailto:sydkya@gmail.com">sydkya@gmail.com</a></td>
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<tr>
<td>Tanki Motsepa</td>
<td><a href="mailto:ttmotsepa@gmail.com">ttmotsepa@gmail.com</a></td>
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<tr>
<td>Tugba Sasmaz Kuru</td>
<td><a href="mailto:tugba.sasmaz@okan.edu.tr">tugba.sasmaz@okan.edu.tr</a></td>
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<tr>
<td>Tuğba Sezgin Arslan</td>
<td><a href="mailto:tsezgin16@gmail.com">tsezgin16@gmail.com</a></td>
</tr>
<tr>
<td>Umut Ozkaya</td>
<td><a href="mailto:uozkaya@selcuk.edu.tr">uozkaya@selcuk.edu.tr</a></td>
</tr>
<tr>
<td>Vahide Bulut</td>
<td><a href="mailto:vahidebulut@mail.ege.edu.tr">vahidebulut@mail.ege.edu.tr</a></td>
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<tr>
<td>Wissem Mhiri</td>
<td><a href="mailto:mh.wissem@gmail.com">mh.wissem@gmail.com</a></td>
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<td>Yaprak Güldoğan</td>
<td><a href="mailto:guldogan@yildiz.edu.tr">guldogan@yildiz.edu.tr</a></td>
</tr>
<tr>
<td>Yasemin Bagci</td>
<td><a href="mailto:yasemin_bagci72@hotmail.com">yasemin_bagci72@hotmail.com</a></td>
</tr>
<tr>
<td>Yasemin Sunucu Karafaktioglu</td>
<td><a href="mailto:yasemin.sunucu@usak.edu.tr">yasemin.sunucu@usak.edu.tr</a></td>
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<tr>
<td>Yasin Ucakan</td>
<td><a href="mailto:yasinucakan@hotmail.com">yasinucakan@hotmail.com</a></td>
</tr>
<tr>
<td>Yelda Aygar</td>
<td><a href="mailto:yaygar@science.ankara.edu.tr">yaygar@science.ankara.edu.tr</a></td>
</tr>
<tr>
<td>Yılmaz Tunçer</td>
<td><a href="mailto:yilmaz.tuncer@usak.edu.tr">yilmaz.tuncer@usak.edu.tr</a></td>
</tr>
<tr>
<td>Yılmaz Kaya</td>
<td><a href="mailto:yilmaz.kaya@omu.edu.tr">yilmaz.kaya@omu.edu.tr</a></td>
</tr>
<tr>
<td>Yusuf Yılmaz</td>
<td><a href="mailto:ysfyilmaz60@gmail.com">ysfyilmaz60@gmail.com</a></td>
</tr>
<tr>
<td>Zehra Pınar</td>
<td><a href="mailto:zpinar@nku.edu.tr">zpinar@nku.edu.tr</a></td>
</tr>
<tr>
<td>Zekeriya Ustaoglu</td>
<td><a href="mailto:zekeriyaustaoglu@beun.edu.tr">zekeriyaustaoglu@beun.edu.tr</a></td>
</tr>
<tr>
<td>Zeki Unal Yumun</td>
<td><a href="mailto:zyumun@nku.edu.tr">zyumun@nku.edu.tr</a></td>
</tr>
<tr>
<td>Zohra Djeridi</td>
<td><a href="mailto:zdjeridi2002@yahoo.fr">zdjeridi2002@yahoo.fr</a></td>
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Invited Talks
Recent progress in the analytical and numerical treatment of partial differential equations of fractional order

SHAHER MOMANI

Department of Mathematics, Faculty of Science, The University of Jordan,
Amman, 1194, Jordan,
shahermm@yahoo.com

Abstract

Analytical and numerical methods for the solution of fractional partial differential equations made enormous progress during the last 10 years because many complex physical and biological systems can be represented more accurately through fractional derivative formulation. In this talk we report on recent research work on the develop of new analytical and numerical methods for the solution of partial differential equations of fractional order and explain their respective strengths and weaknesses. Several numerical examples are given to demonstrate the effectiveness and weaknesses of the present methods.

Keywords: Fractional partial differential equations, Differential transform method, Homotopy perturbation method, Variational iteration method, Adomian decomposition method, Reproducing kernel algorithm

General area of research: Mathematics
A numerical comparison for resent modifications of the decomposition methods for nonlinear fractional KdV equations

Dogan Kaya

Istanbul Commerce University, Department of Mathematics, Istanbul, Turkey,
dogank@ticaret.edu.tr

Abstract

In this work, we apply some old and a new decomposition scheme to solve the fractional KdV equation and fractional modified KdV equation which are characterized by the solitary wave solutions of the classical nonlinear equations that lead to solitons [1-16]. We meant with the classical nonlinear equations of interest usually admit for the existence of a special type of the traveling wave solutions which are either solitary waves or solitons [1-12]. These approaches are based on the choice of a suitable differential operator which may be ordinary or partial, linear or nonlinear, deterministic or stochastic. It does not require discretization and consequently of massive computation.

In this scheme the solution is performed in the form of a convergent power series with easily computable components. This section is particularly concerned with the modified decomposition methods. We also get numerical results of these particular fractional equations for numerical purpose of the numerical comparisons for those considered different versions of the methods. The numerical results demonstrate that the many of them are relatively accurate and easily implemented.

Keywords: The Rach–Adomian–Meyers modified decomposition method, Fractional KdV equation, Fractional mKdV, Modified Riemann–Liouville derivative

General area of research: Mathematics

References


Group classification of differential equations

CHAUDRY MASOOD KHALIQUE

International Institute for Symmetry Analysis and Mathematical Modelling
Department of Mathematical Sciences, North-West University, Mafikeng Campus
Private Bag X2046, Mmabatho 2735, Republic of South Africa,
Masood.Khalique@nwu.ac.za

Abstract

Many differential equations which model real-world phenomena of engineering and physical sciences often involve arbitrary elements (parameters or functions). In practice these arbitrary elements are determined experimentally. However, it may happen that the same result is achieved by assuming that the arbitrary element is such that the underlying differential equation admits an additional symmetry group. This is referred to as the problem of group classification of differential equations. Conventionally the process for solving a group classification problem comprises the derivation of the equivalence group which is then exploited to simplify the classifying equations and hence, stipulate the arbitrary elements. The purpose of this talk is to unveil, through examples, the concrete methods accessible for Lie group classification of differential equations.

Keywords : Differential equations, Group classification, Equivalence group

General area of research : Mathematics
The outer automorphism of $PGL(2, \mathbb{Z})$ and the induced 'modular' involution of the real line

MUHAMMED ULUDAG and HAKAN AYRAL

Department of Mathematics, Galatasaray University, Istanbul, Turkey, muhammed.uludag@gmail.com

Abstract

We study the involution of the real line induced by the outer automorphism of the extended modular group $PGL(2, \mathbb{Z})$. This 'modular' involution is discontinuous at rationals but satisfies a surprising collection of functional equations. It preserves the set of real quadratic irrationalities mapping them in a highly non-obvious way to each other. It commutes with the Galois conjugation on the set of real quadratic irrationals. It generates, in a certain sense, the units of negative norm in quadratic number fields and defines an involution of units of positive norm.

More generally, it preserves setwise the orbits of the modular group, thereby inducing an involution of the moduli space of real rank-two lattices. It induces a duality of Beatty partitions of the set of positive integers. It also induces a subtle symmetry of Lebesgue’s measure.

This involution conjugates (though not topologically) the Gauss' continued fraction map to an intermittent dynamical system on the unit interval with an infinite invariant measure. The transfer operator (resp. the functional equation) naturally associated to this dynamical system is closely related to the Mayer transfer operator (resp. the Lewis' functional equation).

We give a description of this involution as the boundary action of a certain automorphism of the infinite trivalent tree. We prove that its derivative exists and vanishes almost everywhere. It is conjectured that algebraic numbers of degree at least three are mapped to transcendental numbers under this involution.

General area of research : Mathematics
Solving a second order fuzzy initial value problem using Heaviside function

OMER AKIN

President of Association of Mathematicians (MATDER) and The Department of Mathematics In TOBB University Of Economics and Technology, Istanbul, Turkey, omerakin@etu.edu.tr

Abstract

In this paper, we reformulate the algorithm in [19] to find an analytical expression for \(\alpha\)-cuts of the solution of the second order nonhomogeneous fuzzy initial value problem with fuzzy initial values and fuzzy forcing terms. Firstly, we apply Zadeh’s Extension Principle to fuzzify the crisp initial value problem. Then, we use the Heaviside function and obtain the analytical form of \(\alpha\)-cuts of the solution of the fuzzy initial value problem. Finally, we illustrate some examples by using the proposed algorithm.

Keywords : Fuzzy Initial Value Problem, Fuzzy Forcing Function, Zadeh’s Extension Principle, Heaviside Function, Breaking Point, Structure Vector

General area of research : Mathematics

References


ICFAS2016

Mathematics
A numerical comparison for resent modifications of the decomposition methods for nonlinear fractional KdV equations

Dogan Kaya

Istanbul Commerce University, Department of Mathematics, Istanbul, Turkey, dogank@ticaret.edu.tr

Abstract

In this work, we apply some old and a new decomposition scheme to solve the fractional KdV equation and fractional modified KdV equation which are characterized by the solitary wave solutions of the classical nonlinear equations that lead to solitons [1-16]. We meant with the classical nonlinear equations of interest usually admit for the existence of a special type of the traveling wave solutions which are either solitary waves or solitons [1-12]. These approaches are based on the choice of a suitable differential operator which may be ordinary or partial, linear or nonlinear, deterministic or stochastic. It does not require discretization and consequently of massive computation.

In this scheme the solution is performed in the form of a convergent power series with easily computable components. This section is particularly concerned with the modified decomposition methods. We also get numerical results of these particular fractional equations for numerical purpose of the numerical comparisons for those considered different versions of the methods. The numerical results demonstrate that the many of them are relatively accurate and easily implemented.

Keywords : The Rach–Adomian–Meyers modified decomposition method, Fractional KdV equation, Fractional mKdV, Modified Riemann–Liouville derivative

General area of research : Mathematics

References


On the extension of Gamma and associated functions and their roles on the fractional operators

ADEM KILICMAN

Department of Mathematics, University Putra, 43400 Serdang, Selangor, Malaysia
akilic@upm.edu.my

Abstract

In mathematics, there are several special functions. One of the well known is the Gamma function which is a generalization of the factorial. Later the Gamma function is defined to be an extension of the factorial to real and complex number arguments.

However, in the classical sense functions is not defined for the negative integer thus still it was an open problem to give satisfactory definition for the negative integers. Further the gamma function has some remarkable qualities: For example, it has an infinite number of maxima and minima and it cannot be the solution of a differential equation with algebraic coefficients, see the details [1,2,3].

In this study, we present some interesting aspects of Gamma and associated functions for negative values and some of their features of fractional calculus and fractional operators in differential manifold. Some further interesting results are also deduced, see [1,4,5].

2000 Mathematics Subject Classification(AMS) : 26A33, 58A05, 58D17

Keywords : Gamma functions, Associated Gamma Functions, Fractional operators, Revised Riemann-Liouville fractional operator

General area of research : Mathematics

References


Forced vibration of the pre-stressed bi-layered plate–strip made of aluminum and steel under the action of an arbitrary inclined force

Ahmet Dasdemir

Department of Mathematics, Faculty of Arts and Sciences, Kastamonu University, Kastamonu, Turkey, ahmetdasdemir37@gmail.com

Abstract

Within the scope of the piecewise homogeneous body model with utilizing of the three dimensional linearized theory of elastic waves in initially stressed bodies the frequency response of a pre-stressed bi-layered plate-strip made of Aluminum (Al) and Steel (St) under the action of an arbitrary inclined time-harmonic force resting on a rigid foundation is investigated. It is assumed that there exists the complete contact between the layers and between the plate-strip and the rigid foundation. The mathematical modeling of the current problem is solved by using the finite element method (FEM), and the numerical results illustrating the influence of the parameter characterizing the problem on the frequency response of the stresses acting on the interface planes between the layers and between the plate-strip and rigid foundation are presented and discussed. In particular, the effect of a change in the value of the initial stretching and the initial compressing parameter on the frequency response under consideration is analyzed.

Keywords : Bi-layered plate–strip, Frequency response, Initial stress, Time-harmonic force

General area of research : Mathematics
Abstract

In computer science, a one–way function is a function that is easy to compute on every input, but hard to invert given the image of a random input. Here, "easy" and "hard" are to be understood in the sense of computational complexity theory, specifically the theory of polynomial time problems. Not being one–to–one is not considered sufficient of a function for it to be called one–way (see Theoretical Definition, in article). A twin prime is a prime number that has a prime gap of two, in other words, differs from another prime number by two, for example the twin prime pair (5, 3). The question of whether there exist infinitely many twin primes has been one of the great open questions in number theory for many years. This is the content of the twin prime conjecture, which states: There are infinitely many primes $p$ such that $p + 2$ is also prime. In this work we define a new notion: ‘$r$–prime number of degree $k$’ and we give a new RSA trap–door one–way. This notion generalized a twin prime numbers because the twin prime numbers are $2$–prime numbers of degree 1.

**Keywords** : RSA, Prime number, One–way function, Cryptography

**General area of research** : Mathematics
ID–ICFAS2016: 1036

Bayesian predictive design using the $p$–value for two steps experimental trials

Zohra Djeridi¹ and Hayet Merabet²

¹Department of Mathematics, Jijel University, Constantine 1 University, Algeria, zdjeridi2002@yahoo.fr
²Laboratoire de mathématiques appliquées et modélisation, Constantine 1, Algeria, merabethammadi@outlook.com

Abstract

Two or three stage designs are commonly used in phase II cancer clinical trials. The aim of such phase is to determine whether a new treatment is promising for further testing in confirmatory clinical trials. Most exploratory clinical trials are designed as single–arm ones with or without interim monitoring for early stopping. In this paper, we will focus on the one arm phase II trials with binary endpoints. Multi-stage designs are often implemented in such settings in order to increase the study’s efficiency by allowing early termination if the treatment is ineffectively deemed. They possess better statistical properties than the single–stage designs by utilizing the information gained in the interim data. In those designs, if no responses are observed in the first stage, then the new treatment is abandoned.

In this work, we suggest that it is interesting to take into account the degree of our satisfaction at the end of each stage. For this reason, we propose to the practitioner the use of indexes that measure this degree of satisfaction.

This paper proposes a “hybrid” Bayesian design for single–arm exploratory clinical trials with binary outcomes based on the index of satisfaction created by Merabet (2004), which is a function of the p-value and on its Bayesian prediction. The proposed design consists of the calculation of the index of satisfaction and sample size selection at any required stage following interim analysis during the course of trial. We compared it with Simon’s designs respecting the statistical considerations of the protocol of a phase II trial.

The design with the index of satisfaction approach provides an excellent alternative for conducting multistage phase II trials. It is sufficient and flexible. It is based on the predictive probability and the sample size can be determined by choosing the smallest among all designs that satisfy the design criteria.
On the other hand, the interim monitoring using the prediction of satisfaction design can be generalized to more than two-stage designs using the sequential boundaries.

**Keywords**: Bayesian prediction, $p$-value, Clinical trials

**General area of research**: Mathematics
Nonlinear problem in a three dimensional thin domain with friction law

MOURAD DILMI$^1$ AND HAMID BENSERIDI$^2$

$^1$Applied Mathematics Laboratory, Department of Mathematics, Sétif I-University, Algeria,
mouraddil@yahoo.fr

$^2$Department of Mathematics, Faculty of Sciences, Sétif University, Algeria,
m_benseridi@yahoo.fr

Abstract

In this paper, we are interested in the asymptotic behavior of nonlinear problem in a three dimensional thin domain $W^\varepsilon$. We assume the Fourier boundary condition at the top surface and a nonlinear Tresca interface condition at the bottom one. The weak form of the problem is a variational inequality. We use the approach which consists in transposing the problem initially posed in the domain $W^\varepsilon$ which depend on a small parameter $\varepsilon$ in an equivalent problem posed in the fixed domain $W$ which is independent of $\varepsilon$. We prove that the limit solution satisfies also a variational inequality. We further obtain a weak form of the Reynolds equation and give a lower-dimensional Bingham law.

Keywords: Free boundary problems, Bingham fluid, Asymptotic approach, Reynolds equation

General area of research: Mathematics
A non local ring \( \mathbb{F}_q[e]; e^3 = e^2 \)

Aziz Boulbot\(^1\), Abdelhakim Chillali\(^2\), and Ali Mouhib\(^3\)

\(^1\) Sidi Mohamed Ben Abdellah University, FP, LSI, Taza, Morocco, 
asiz.boulbot@usmba.ac.ma

\(^2\) Sidi Mohamed Ben Abdellah University, FP, LSI, Taza, Morocco, 
abdelhakim.chillali@usmba.ac.ma

\(^3\) Sidi Mohamed Ben Abdellah University, FP, LSI, Taza, Morocco, 
ali.mouhib@usmba.ac.ma

Abstract

Let \( \mathbb{F}_q \) a finite field of \( q \) elements, where \( q \) is a power of a prime number \( p \) greater than or equal to 5. In this paper, we introduce the a non local ring \( \mathbb{F}_q[e] \), where \( e^3 = e^2 \), we study it’s arithmetic and we established some useful results which are necessary for the rest of this paper. In the last section, we define the elliptic curve over \( \mathbb{F}_q[e] \), we study of it’s discriminant and it’s Weierstrass equation which are necessary to classify the elements of this curve and we determined the classification of the torsion group of the curve.

Keywords : Finite field, Finite ring, Local ring, Elliptic curves, Cryptography

General area of research : Mathematics
On the regularity results for the Stokes operator with mixed boundary conditions

Hamid Benseridi\(^1\) and Mourad Dilmi\(^2\)

\(^1\)Department of Mathematics, Faculty of Sciences, Sétif University, Algeria, m_benseridi@yahoo.fr
\(^2\)Applied Mathematics Laboratory, Department of Mathematics, Setif I-University, Algeria, mouraddil@yahoo.fr

Abstract

In this paper, we study the existence, uniqueness and regularity for the solution of nonlinear boundary value problem governed by stationary Stokes system perturbed with mixed boundary conditions (Dirichlet- maximal monotone graph) in a smooth domain. This work is an extension to similary ones where the boundary conditions are usual (Dirichlet, Neumann, Signorini,...).

Keywords : A priori inequalities, Maximal monotone graph, Stokes, Variational problem

General area of research : Mathematics
Solutions and conservation laws for a generalized 
\((2 + 1)\)–dimensional Jaulent-Miodek equation

Tanki Motsepa

International Institute for Symmetry Analysis and Mathematical Modelling, 
Department of Mathematical Sciences, North-West University, Mafikeng Campus, 
Private Bag X 2046, Mmabatho 2735, Republic of South Africa, 
ttmotsepa@gmail.com

Abstract

In this talk we study a generalized \((2 + 1)\)–dimensional Jaulent–Miodek equation which has applications in many scientific fields. We obtain exact solutions and conservation laws for this equation.

Keywords : A generalized \((2 + 1)\)–dimensional Jaulent–Miodek equation, Exact solutions, Conservation laws

General area of research : Mathematics
Laguerre polynomial approach for solving nonlinear Klein–Gordon equations

Burcu Gurbuz\(^1\) and Mehmet Sezer\(^2\)

\(^1\)Department of Mathematics, Manisa Celal Bayar University, Manisa, 45140, Turkey, burcugrbz@gmail.com

\(^2\)Department of Mathematics, Manisa Celal Bayar University, Manisa, 45140, Turkey, mehmet.sezer@cbu.edu.tr

Abstract

Nonlinear phenomena occurs in many areas of scientific such as solid state physics, plasma physics, fluid dynamics, mathematical biology and chemical kinematics and can be modeled by partial differential equations. Klein–Gordon equations are an important class of partial differential equations and arises in relativistic quantum mechanics and field theory, which is great importance for the high energy physicist, and is used to model many different phenomena, including the propagation of dislocations in crystals and the behavior of elementary particles. On the other hand, the one–dimensional nonlinear Klein–Gordon equation plays an important role in mathematical physics; for example, in studying the condensed matter physics, in investigating the interaction of solitons, in a collisionless plasma, in examining the nonlinear wave equations, in solid state physics, in nonlinear optics and quantum field theory. In this work, in order to obtain the numerical approximations of the one–dimensional nonlinear Klein–Gordon equations, we develop a matrix method based on collocation points and Laguerre polynomials. The method is applied to some test examples and the numerical results are compared with the exact solutions. The results reveal that the method is very effective, simple and convenient. In addition, an error estimation based on residual function for the proposed method is presented.

Keywords: Nonlinear Klein–Gordon equations, Laguerre matrix method, Laguerre polynomials and series with two variables, Collocation points, Residual error analysis

General area of research: Mathematics
ID–ICFAS2016: 1066

An iterative approach for the solution of nonlinear functional differential equations of fractional order

Khadidja Nisse\textsuperscript{1} and Lamine Nisse\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Echahide Hamma Lakhdar–El–Oued University, Algeria, khadidjanisse@yahoo.com
\textsuperscript{2}Laboratory of Applied Mathematics, Badji Mokhtar–Annaba University, Annaba, Algeria, laminisse@gmail.com

Abstract

Our purpose is to study the existence and uniqueness of the solution for an initial value problem of nonlinear fractional differential equations with deviating arguments. We use an appropriate iterative method to show our result, with conditions for which the usual methods of contractions do not apply.

\textbf{Keywords} : Functional differential equations, Fractional calculus iterative procedures

\textbf{General area of research} : Mathematics
Eigenparameter dependent nonself-adjoint Dirac operators with transmission condition

ISIL ACIK DEMIRCI\textsuperscript{1} and BILENDER P. ALLAHVERDIEV\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Mehmet Akif Ersoy University, Burdur, 15100, Turkey, 
isilacik@yahoo.com
\textsuperscript{2}Department of Mathematics, Suleyman Demirel University, Isparta, Turkey, 
bilenderpasaoglu@sdu.edu.tr

Abstract

In this study, we consider nonself–adjoint Dirac operators boundary value transmission problems with a singular inner point in the limit circle–case. A self-adjoint dilation and a functional model of the maximal dissipative operator are constructed and the characteristic function is defined. It is shown that the system of eigenvectors and associated vectors are complete in the Hilbert space.

Keywords: Dissipative singular Dirac system, Spectral parameter in the boundary condition, Transmission condition, Self–adjoint dilatation, Maximal dissipative operator, Functional model, Characteristic function, Completeness of the system of eigenvectors and associated vectors

General area of research: Mathematics
Social networking for mobile devices

MIRSAT YESILTEPE\textsuperscript{1} AND MUHAMMET KURULAY\textsuperscript{2}

\textsuperscript{1}Department of Mathematical Engineering, Yildiz Technical University, Istanbul, 34000, Turkey, mirsatyesiltepe@hotmail.com

\textsuperscript{2}Department of Mathematical Engineering, Yildiz Technical University, Istanbul, 34000, Turkey, mkurulay@yildiz.edu.tr

Abstract

Today there are a variety of device types that are associated with the Internet. But users are not associated with any device type as mobile devices. So today is to accept some social media sites, the member with the confirmation message via telephone number before accepting. This study will be described principles of working on a mobile operating system (eg. IOS, Android) of the social media site. The same operating systems as to whether the work of different mechanisms for different social media sites is another issue the working conditions.

Keywords: Single sign on, Future proofing, Orientation

General area of research: Mathematics
ID–ICFAS2016: 1105

Exact solution of linear integro-differential equations with weakly singular kernel by using Taylor expansion method

Fernane Khaireddine\textsuperscript{1} and Ellaggoune Fateh\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, University 08 Mai 1945 Guelma, P.O.Box 401, 24000, Guelma, Algeria, kfernane@yahoo
\textsuperscript{2}Department of Mathematics, University 08 Mai 1945 Guelma, P.O.Box 401, 24000, Guelma, Algeria, fellaggoune@gmail.com

Abstract

In this paper, we apply Taylor’s approximation and then transform the given nth-order weakly singular linear Volterra and Fredholm integro-differential equations with into an ordinary linear differential equation. Some different examples are considered the results of these examples indicated that the procedure of transformation method is simple and effective, and could provide an accurate approximate solution or exact solution.

Keywords : General Abel Integral, Integro-differential equations, Weakly singular Fredholm integral-equations, Weakly singular Volterra integral-equations

General area of research : Mathematics
Free surface flow under a gate with gravity and surface tension effect

Abdelkrim Merzougui\textsuperscript{1} and Abdelkader Laiadi\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Faculty of Mathematics and Informatic, M'sila University BP 166 M’sila 28000, Algeria,
shamdadz@yahoo.fr

Abstract

In this work we consider the problem of free-surface flows under a gate that is inclined at an angle $\gamma$. The fluid is treated as inviscid and incompressible. The flow is assumed to be steady two-dimensional and irrotational. The effect of surface tension and gravity are taken into account. The flow is characterized by the following parameters: Froude number $Fr = \frac{U}{\sqrt{gH}}$ and the inverse Weber number $We = \frac{T}{\frac{\rho U}{2H}}$. Here $T$ is the surface tension, $g$ is gravity, $U$ the velocity at the upstream and $\rho$ is the fluid density. Dynamic boundary condition is applied on both upstream and downstream free surfaces subject to gravitational force and surface tension. Fully nonlinear problem is solved numerically by using boundary integral equation technique. After the discretization, we obtain a system of nonlinear algebraic equations which can be solved by the Newton’s method. When the upstream free surface separates at a stagnation point, nonlinear effect on the upstream waves is apparent so that the waves tend to develop narrow crests and broad troughs. Numerical results for inclined gate are presented and discussed for various values of the inverse Weber number $\delta$ and the Froude number $Fr$.

Keywords : Free surface flow, Surface tension, Inclined gate, Weber number, Froude number, Integro-differential equations

General area of research : Mathematics
Direct integration and homotopy perturbation method for (2+1) dimensional breaking soliton equation

Guldem Yildiz¹ and Durmus Daghan²

¹Department of Mathematics, Nigde University, 51200, Nigde, Turkey, guldem.yildiz@nigde.edu.tr
²Department of Mathematics, Nigde University, 51200, Nigde, Turkey, durmusdaghan@nigde.edu.tr

Abstract

The non-linear partial differential (2+1) dimensional Breaking Soliton equation is studied by using the direct integration and homotopy perturbation method. In this study, we use direct integration to obtain the well known solution in the literature in practical and shortest way by assigning some special values to the constants in the solutions of the (2+1) dimensional Breaking Soliton equation. We also obtain same type solution for (2+1) dimensional Breaking soliton equation by using the homotopy perturbation method with one iteration. Similarly, same type solutions can be done different methods such as (G'/G)-expansion method.

Keywords : Breaking soliton equation, Homotopy perturbation method, Direct integration

General area of research : Mathematics
The quadratically cubic burgers equation: Models and analytical solutions

Zehra Pinar

Department of Mathematics, Faculty of Arts and Science, Namik Kemal University, Tekirdag, Turkey, zpinar@nku.edu.tr

Abstract

A new exactly solvable model of mathematical physics is proposed as a modified form equation of Burgers type with a Quadratically Cubic (QC) nonlinear term. Also, the derivation and physical meaning of the problem have not been mentioned too much till now. The physical meaning and generality of this QC nonlinearity is given by several examples and experimental results in the literature. The exact solutions are obtained via Lie group transformations and classical wave transformation with the Auxiliary equation method and Hermite approximation method.

Keywords: Lie group transformation, Wave transformation, Auxiliary equation method, Hermite approximation method

General area of research: Mathematics
Some Tauberian conditions for the \((l, k)\) summability of integrals and sequences

Muhammet Ali Okur\textsuperscript{1} and Umit Totur\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Adnan Menderes University, Kepez Mevkii, 09010, Aydin, Turkey, mali.okur2@gmail.com

\textsuperscript{2}Department of Mathematics, Adnan Menderes University, Kepez Mevkii, 09010, Aydin, Turkey, utotur@yahoo.com

Abstract

In this paper, we obtain some new Tauberian theorems for the logarithmic summability of order \(k\) of integrals and sequences. Our results are generalizations of the results in [U. Totur, M. A. Okur, On Tauberian conditions for the logarithmic methods of integrability, Bull. Malays. Math. Sci. Soc. (2016) DOI 10.1007/s40840-016-0371-x].

\underline{Keywords} : Tauberian theorem, Tauberian condition, \((l, k)\) summability method of integrals, \((l, k)\) summability method of sequences

\underline{General area of research} : Mathematics
Abstract

For a sequence \((u_n)\) of real numbers, the logarithmic mean of \((u_n)\) is defined by

\[
l_{n,1}(u) = \frac{1}{\gamma_{n,1}} \sum_{k=0}^{n} \frac{u_k}{k+1},
\]

where

\[
\gamma_{n,1} = \sum_{k=0}^{n} \frac{1}{k+1} : \log n.
\]

If \(\lim_{n \to \infty} l_{n,1}(u) = s\) exists, then we say that the sequence \((u_n)\) is logarithmic summable to a finite number \(s\). In this study, we prove some Tauberian remainder theorems for the logarithmic summability method.

Keywords: Tauberian remainder theorem, Logarithmic summability method, \(\lambda\)-bounded sequence

General area of research: Mathematics
Existence and behavior infinite time of solution for quasilinear parabolic equations with nonlocal boundary conditions

Benabderrahmane Benyattou\textsuperscript{1} and Rahmoune Abita\textsuperscript{2}

\textsuperscript{1}Faculty of Mathematics and Informatics, Mohamed Boudiaf University-M’Sila, BP 166, M’Sila, 28000, Algeria, bbenyattou@yahoo.com
\textsuperscript{2}Laboratory of Computer Sciences and Mathematics, Laghouat university, Algeria, abitarahmoune@yahoo.fr

Abstract

The initial boundary value problem for the quasi linear parabolic equation with nonlocal boundary conditions for nonlinear elasticity equation is considered. Our aim is, by using the Faedo–Galerkin approximation and compactness method, to show under some hypothesis on data functions the existence of a generalized solution, uniqueness and behavior of solutions for this problem in infinite time.

Keywords : Asymptotic behavior, Compactness method, Faedo–Galerkin approximation, Generalized solution, Nonlocal boundary conditions

General area of research : Mathematics
Projected Tikhonov regularization method for Fredholm integral equations of the first kind

NADJIB BOUSSSETILA

Department of Mathematics, FMISM, U. Guelma, Algeria,
n.bousssetila@gmail.com

Abstract

In this paper, we consider a variant of projected Tikhonov regularization method for solving Fredholm integral equations of the first kind. We give the theoretical analysis of this method in the Hilbert space $L^2(a, b)$ setting, and we establish some convergence rates under certain regularity on the exact solution and the kernel $k(.,.)$. Some numerical results are also presented.

Keywords: Ill-posed problems, Integral equation of the first kind, Projected Tikhonov regularization method

General area of research: Mathematics
A new type measure of noncompactness

Merve Ilkhan\textsuperscript{1} and Emrah Evren Kara\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Duzce University, Konuralp, Duzce, 81620, Turkey, merveilkhan@gmail.com

\textsuperscript{2}Department of Mathematics, Duzce University, Konuralp, Duzce, 81620, Turkey, karaeevren@gmail.com

Abstract

The measures of noncompactness have very important applications in fixed point theory, the theory of differential and integral equations, and the characterizations of classes of compact operators between certain Banach spaces. In this presentation, we define Bourbaki-Hausdorff measure of noncompactness of a bounded set in a metric space and give some properties of this notion.

Keywords: Bourbaki-boundedness, Totally boundedness, Measures of noncompactness

General area of research: Mathematics
Some new spaces of Lacunary ideal convergent sequences

Merve Ilkhan¹ and Emrah Evren Kara²

¹Department of Mathematics, Duzce University, Konuralp, Duzce, 81620, Turkey, merveilkhan@gmail.com
²Department of Mathematics, Duzce University, Konuralp, Duzce, 81620, Turkey, karaeevren@gmail.com

Abstract

As generalization of convergence, ideal convergence was defined by the aid of ideal which is a family of subsets of natural numbers. The purpose of this presentation is to introduce some new sequence spaces combining ideal convergence, Lacunary sequence and Orlicz function. Also, some topological structures and algebraic properties of these spaces are investigated and some relations related to these spaces are obtained.

Keywords: Lacunary sequence, Orlicz function, Ideal convergence

General area of research: Mathematics
A common generalization of fuzzy primes

Naser Zamani

Faculty of Math. Science, University of Mohaghegh Ardabili, P.O.Box 179, Ardabil, Iran, naserzaka@yahoo.com

Abstract

Let $R$ be a commutative ring and let $M$ be a unitary $R$–module. The notion of fuzzy prime sub-modules of $M$ has been appeared in [J. N. Mordeson, D. S. Malik, Fuzzy Commutative Algebra, World Scientific Publishing, 1998]. In this talk the concept of fuzzy $\varphi$–prime sub-modules will be defined. Some properties of this notion will be studied. It will be shown that the fuzzy $\varphi$–primeness of a fuzzy sub-module $\mu$ of $M$ together with other mild assumptions on $\mu$ , gives $\mu$ as a fuzzy prime. The behavior of this concept in the product modules and fuzzy quotient modules will be studied. Also, several results concerning the fuzzy primeness of fuzzy localization sub-modules will be investigated.

Keywords : Fuzzy localization, Fuzzy primeness, Sup property, Fuzzy $\varphi$–prime ideal

General area of research : Mathematics
ID–ICFAS2016: 1125

**Generalized result of global solutions to a class of a reaction-diffusion system**

**Salah Badraoui**

Department of MathematicsvBP.401, University 8 Mai 1945 Guelma, Guelma 24000, Algeria, badraoui.salah@univ-guelma.dz

**Abstract**

We prove in this work a generalized result of global classical solutions in time to a class of a reaction diffusion system domain defined on a bounded in $\mathbb{R}^n$. The system was studied by J. I. Kanel and M. Kirane [J. I. Kanel, M. Kirane, Glabal existence and large time behavior of positive solutions to a reaction-diffusion system, Differ. Integral Equ. 13(1-3) (2000) 255–264] in the case where the term of reaction is in the form $f(u, v) = h_1(u)h_2(v)$ and $h_1(0) = 0$. In the case where $0 \leq f(u, v) \leq k\varphi(u)e^{\sigma v}$, for all $u, v \in \mathbb{R}$, where $k > 0$ and $\sigma > 0$ are constants, the system was studied by the same authors [J. I. Kanel, M. Kirane, Global solutions of reaction-diffusion systems with a balance law and nonlinearities of exponential growth, J. Differential Equations 165(1) (2000) 24–41].

**Keywords**: Reaction-diffusion equations, Positivity of solutions, Global existence, Uniform boundedness, Continuous semigroups, Lyapunov functional

**General area of research**: Mathematics
Approximate analytic solution for Lorenz system with time delay

ABDEEL-KAREM ALOMARI

Department of Mathematics, Yarmouk University, Irbid 211–63,
abdomari2008@yahoo.com

Abstract

In this study, we present a new algorithm based on homotopy analysis method for solving Lorenz system with time delay. Several values for the delay time are considered and the attractors for those values are plotted. Finally, we give an error analysis for the new algorithm.

Keywords : Nonlinear system of differential equations, Homotopy analysis method, Time delay differential equations

General area of research : Mathematics
On the oscillation of nonlinear fractional difference equations

Suleyman Adiyaman and Mustafa Kemal Yildiz

Suleyman Adiyaman

Department of Mathematics, Faculty of Science and Literature, Afyon Kocatepe University, Afyonkarahisar, 03200, Turkey
suleyman.adiyaman@hotmail.com

Mustafa Kemal Yildiz

Department of Mathematics, Faculty of Science and Literature, Afyon Kocatepe University, Afyonkarahisar, 03200, Turkey
myildiz@aku.edu.tr

Abstract

In this paper, we study oscillatory behavior of the fractional difference equations of the following form

\[
\Delta (c(t)(\Delta^\alpha x(t))^\gamma) + p(t)(\Delta^\alpha x(t))^\gamma + q(t)f\left(\sum_{s=t_0}^{t-s+\alpha} (t-s-1)^{(-\alpha)}x(s)\right) = 0,
\]

where \(\Delta^\alpha\) denotes the Riemann-Liouville difference operator of order \(0 < \alpha < 1\) and \(\gamma > 0\) is a quotient of odd positive integers. We establish some oscillation criteria for the above equation by using Riccati transformation technique and some Hardy type inequalities. An example is provided to illustrate our main results.

Keywords: Difference equations, Oscillation, Nonlinear, Fractional order

General area of research: Mathematics
Constant ratio quaternionic curves in euclidean $4$–space $E^4$

**Ilim Kisi**$^1$, Sezgin Buyukkutuk$^2$, and Gunay Ozturk$^3$

$^1$Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, ilim.ayvaz@kocaeli.edu.tr
$^2$Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, sezgin.buyukkutuk@kocaeli.edu.tr
$^3$Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, ogunay@kocaeli.edu.tr

**Abstract**

In this paper, we give some characterizations of spatial quaternionic curves in Euclidean $4$–space $E^4$. We consider a quaternionic curve whose position vector satisfies the parametric equation

$$x(s) = m_0(s)t(s) + m_1(s)n_1(s) + m_2(s)n_2(s) + m_3(s)n_3(s)$$

for some differentiable functions $m_i(s), 0 \leq i \leq 3$ in $E^4$. We characterize such curves in terms of their curvature functions $m_i(s)$ and give the necessary and sufficient conditions to become $W$–curve, constant ratio, $T$–constant, and $N$–constant.

**Keywords** : Position vectors, Frenet equations, Quaternionic curves

**General area of research** : Mathematics
Turing analysis of a mathematical model for interaction between tumor cells and inhibitor

Irem Cay\textsuperscript{1} and Serdal Pamuk\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, irem.atac@kocaeli.edu.tr
\textsuperscript{2}Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, spamuk@kocaeli.edu.tr

Abstract

In this paper we present a 2-D reaction-diffusion system for interaction between tumor cells and inhibitor. We obtain some sufficient conditions in order that Turing instability occurs. We also provide some numerical examples to verify our theoretical results.

Keywords : Turing instability, Reaction-diffusion system, Tumor cell, Inhibitor

General area of research : Mathematics
General methods generate fuzzy equivalence relations of the form $n \times n$ matrices

Mohammad A. Shakhatreh$^1$ and Tariq Qawasmeh$^2$

$^1$Department of Mathematics, Faculty of Science, Yarmuk University, Irbid, 21163, Jordan
mali@yu.edu.jo

$^2$Department of Mathematics, Faculty of Science, Yarmuk University, Irbid, 21163, Jordan
jorqaw@yahoo.com

Abstract

In this paper we will build new methods generate fuzzy equivalence relations of the form $n \times n$ matrices, since it is not easy to check that any fuzzy relation of the form $n \times n$ matrix if it is fuzzy equivalence relation or not, specially to check if it is transitive or not transitive. We will start to build fuzzy equivalence relation of the form $3 \times 3$ matrices, $4 \times 4$ matrices, then by using mathematical induction we will build general methods that generate fuzzy equivalence relations of the form $n \times n$ matrices.

Keywords: Fuzzy sets, Operations on fuzzy sets, Fuzzy relations, Fuzzy equivalence relations

General area of research: Mathematics
A study on Istanbul stock exchange participation index with Markov chain and artificial intelligence

Mehmet Yavuz\(^1\) and Necati Ozdemir\(^2\)

\(^1\)Department of Mathematics–Computer Sciences, Necmettin Erbakan University, 42090, Konya, Turkey, mehmyayavuz@konya.edu.tr

\(^2\)Department of Mathematics, Balikesir University, Balikesir, Turkey, nozdemir@balikesir.edu.tr

Abstract

In this study, trend forecasting of Participation Index, in which the companies applying participation banking principles are included and their stocks are operand in Istanbul Stock Exchange (BIST), is achieved. Participation Index is divided into two as Participation 50 Index (KAT50) and Participation 30 Index (KATLM). Hence KAT50 has been started to be calculated since 09.07.2014, it is seen that there is an insufficient number of studies in this area. So, trend predictions of KAT50 and KATLM with Markov chain theories and Artificial Neural Network (ANN) constitute the main subject of this study. In this work, by using 392 daily closing values of these participation indexes, between 01.01.2015 and 30.06.2016, considering the states of KAT50-KATLM such that increasing, decreasing and remaining stable the Markov chain has been formed. In order to make Markov chain analysis in relation with a prediction of the situation in a future time, the transition probability matrix has been achieved. Taking advantage of this matrix, steady-state analysis of the chain has been made and the trends in a future time of KAT50-KATLM have been forecasted. Also, using 392 daily closing values of these participation indexes, trend predictions of the indexes are obtained with ANN. Moreover, the results found with Markov chain and ANN are compared with figures and tables. Especially, considering investment to these indexes, it is thought that the results obtained are helpful for the individual and institutional investors’ investment decisions.

Keywords : BIST, Participation index, Markov chain analysis, Artificial neural network, Trend prediction

General area of research : Mathematics
Some results on co-Hopf space structure of digital images

Ozgur Ege\textsuperscript{1} and Ismet Karaca\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Faculty of Science and Letters, Celal Bayar University, Muradiye Campus, Yunusemre, Manisa, 45140, Turkey, ozgur.ege@cbu.edu.tr

\textsuperscript{2}Department of Mathematics, Faculty of Science and Letters, Ege University, Turkey, ismet.karaca@ege.edu.tr

Abstract

In this work, we deal with co-Hopf space structure of digital images. We show that any pointed digital image having digital co-Hopf space structure is digitally contractible. We prove that a $\kappa$– retract of a digital co-Hopf space is a digital co-Hopf space. We conclude that a pointed digital image having the same digital homotopy type as a digital co-Hopf space is itself a digital co-Hopf space.

\textbf{Keywords} : Digital image, Digital co-Hopf space, Digital homotopy

\textbf{General area of research} : Mathematics
A characterization of non-null curves according to parallel transport frame in Minkowski space-time

Sezgin Buyukkutuk\textsuperscript{1}, Ilim Kisi\textsuperscript{2}, and Gunay Ozturk\textsuperscript{3}

\textsuperscript{1}Department of Mathematics, Kocaeli University, Kocaeli, Turkey, sezgin.buyukkutuk@kocaeli.edu.tr
\textsuperscript{2}Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, ilim.ayvaz@kocaeli.edu.tr
\textsuperscript{3}Department of Mathematics, Kocaeli University, Kocaeli, 41380, Turkey, ogunay@kocaeli.edu.tr

Abstract

The position vector of a non-null curve in Minkowski space-time can be written as a linear combination of its parallel transport vectors. In the present study, we characterize such curves in terms of their curvature functions. Further, we obtain some results of constant ratio, $T$–constant and $N$–constant type curves in $IE_4^4$.

\textbf{Keywords} : Parallel transport frame, Position vector, Constant-ratio curves

\textbf{General area of research} : Mathematics
Study on spectral analysis of a nonselfadjoint matrix quantum difference equation

Yelda Aygar$^1$ and Seyhmus Yardımcı$^2$

$^1$Department of Mathematics, Ankara University, Ankara, 06100, Turkey, yaygar@science.ankara.edu.tr
$^2$Department of Mathematics, Ankara University, Ankara, 06100, Turkey, seyhmus.yardimci@science.ankara.edu.tr

Abstract

In this study, we deal with the spectral analysis of a matrix $q$–difference equation with spectral singularities including an exponential type Jost solution. We get the properties of Jost solution and continuous spectrum of the operator $L$ generated by same $q$–difference equation. Furthermore, we present a condition that guarantees that the operator $L$ has a finite number of eigenvalues and spectral singularities with finite multiplicities.

Keywords : $q$–difference equation, Jost solution, Spectral singularity, Eigenvalue, Spectral analysis

General area of research : Mathematics
Coefficient estimates for subclasses of \( m \)-fold symmetric bi-univalent functions defined by fractional derivative

F. Muğe Sakar¹ and H. Özlem Günêy²

¹Department of Business Administration, Faculty of Management and Economics, Batman University, 72060, Batman, Turkey, mugesakar@hotmail.com
²Department of Mathematics, Faculty of Science, Dicle University, 21280, Diyarbakir, Turkey, ozlemg@diicle.edu.tr

Abstract

In this study, we introduce and investigate new subclass of the bi-univalent functions using the Faber Polynomials both \( f(z) \) and \( f^{-1}(z) \) are \( m \)-fold symmetric analytic functions. Also we obtain upper bounds for the coefficients are found in this study for analytic bi-univalent functions defined by fractional calculus.

Keywords: Univalent functions, \( m \)-fold symmetric, Fractional operator, Starlike function

General area of research: Mathematics
A new two-variable analogue of Jacobi polynomials

Rabia Aktas¹ and Fatma Tasdelen Yesildal²

¹Department of Mathematics, Faculty of Science, Ankara University, Ankara, 06100, Turkey, raktas@science.ankara.edu.tr
²Department of Mathematics, Faculty of Science, Ankara University, Ankara, 06100, Turkey, tasdelen@science.ankara.edu.tr

Abstract

In the present paper, we introduce a new two-variable analogue of the classical Jacobi polynomials and we obtain some recurrence formulas and integral representations involving Laguerre polynomials for these polynomials. We also give some representations of these polynomials in terms of some well-known polynomials.

Keywords: Jacobi polynomials, Recurrence formula, Integral representation

General area of research: Mathematics
A note on a class of polynomials of several variables

Rabia Aktas

Department of Mathematics, Faculty of Science, Ankara University, Ankara, 06100, Turkey,
raktas@science.ankara.edu.tr

Abstract

The purpose of this paper is to construct a family of polynomials of several variables and to obtain some properties such as recurrence formula and generating function satisfied by these polynomials. Furthermore, we derive various families of multilateral generating functions for these polynomials and then, we present some special cases of obtained results.

Keywords : Rodrigues formula, Recurrence formula, Generating function, Multilateral generating function

General area of research : Mathematics
Computational method for different types of delay
differential equations based on reproducing kernel
method

Banan Maayah

Department of Mathematics, Faculty of Science, The University of Jordan,
Amman, 1194, Jordan,
bnan_m3ay3ah@yahoo.com

Abstract

The reproducing kernel Hilbert space method (RKHSM) is applied to find approximate solution of ordinary and partial differential equations. In this take we present numerical solution of fractional delay differential equations satisfying initial conditions. Fractional delay differential equations provide valuable tools for modeling physical phenomena by giving explanations behave like the real process, so the interest for them will keep growing in many scientific areas, the fractional derivatives are considered in the Caputo sense. Some numerical examples are provided to demonstrate the efficiency and accuracy of the present method by comparing the results of this method with exact solutions. It is shown that RKHSM gives excellent results when applied to both fractional linear and nonlinear delay differential equations.

Keywords : The reproducing kernel Hilbert space method, Fractional delay differential equation, Caputo derivative

General area of research : Mathematics
The multistep reproducing kernel Hilbert space method for solving chaotic and non-chaotic systems

Samia Bushnaq

Department of Basic Sciences, King Abdullah II Faculty of Engineering, Princess Sumaya University for Technology, Amman, 11941, Jordan, s.bushnaq@psut.edu.jo

Abstract

In this article, a numerical scheme based on reproducing kernel Hilbert space method (RKHSM) is devised to solve chaotic and non-chaotic systems. This algorithm is applied to chaotic and non-chaotic differential equations that model the Lotka-Volterra, Chen, Lorenz and Rossler systems. The numerical results demonstrate that reproducing kernel Hilbert space method is a reliable method for solving nonlinear problems.

Keywords: Chaos, Ordinary differential equation, Reproducing kernel Hilbert space method, Iterative method, Numerical solution

General area of research: Mathematics
Identification of source term in time–fractional diffusion equations

Mohammad Al–Jamal

Department of Mathematics, Yarmouk University, Irbid, 21163, Jordan, mfarjamal@yu.edu.jo

Abstract

We present a numerical method for the inverse problem of identifying the source/sink term of a time fractional diffusion equation from noisy internal data. The problem can arise in a diverse set of areas with many applications in environmental engineering, hydrology, and physics. To tackle the instability issue of the inverse problem, we utilize a Tikhonov regularization scheme using the eigenfunction expansion of the forward solution, and the generalized cross-validation method as parameter selection strategy. Several examples are given to validate the effectiveness of the proposed method.

Keywords : Inverse problems, Source term, Regularization, Fractional diffusion

General area of research : Mathematics
New classes of harmonic functions defined by fractional operator

F. Muge Sakar, Yasemin Bagci, and H. Ozlem Guney

Institute of Science, Batman University, Batman, Turkey, yasemin_bagci72@hotmail.com

Abstract

An investigation of new classes of harmonic functions which is defined in terms of fractional operator is presented in the present study. We give sufficient coefficient bound for the function \( f(z) \in HW(\lambda, \beta, t, \alpha) \) and then we give this sufficient coefficient bound is also necessary for \( f(z) \in HW(\lambda, \beta, t, \alpha) \). Furthermore, some useful characterization properties of these classes of functions are given. Some of these properties involve extreme points, convex combination, distortion bounds. Also several corollaries and consequences of the main results are also considered in this work.

Keywords: Harmonic function, Fractional operator, Coefficient estimates, Univalent functions

General area of research: Mathematics
On a new subclass of meromorphic functions with positive and second fixed coefficients

Arzu Akgul

Department of Mathematics, Faculty of Science and Arts, Kocaeli University, Umuttepe Campus, 41380, Kocaeli, Turkey,
akgul@kocaeli.edu.tr

Abstract

In this paper we introduced and investigated a new subclass of meromorphic functions with positive and second fixed coefficients. We obtain coefficient inequality, distortion properties, meromorphically radii of close–to–convexity, starlikeness and convexity, convex linear combinations for the functions $f$ in this class.

Keywords: Meromorphic functions, Positive coefficients, Coefficient inequality, Convex linear combination, Meromorphically starlikeness, Convexity and close–to–convexity

General area of research: Mathematics
Abstract

Constructing quantum codes with a large minimum distance is a main research topic in quantum error correcting codes. A method to build quantum codes via classical codes over binary field were introduced by Calderbank and Shor in [Phys. Rev. A 54 1098,(1996)]. Afterwards, this idea were generalized to the finite fields by Ketkar et al. in [IEEE Trans. Inform. Theory 52 4892-4914, (2006)]. Here, we introduce self-dual and self-orthogonal codes arising from constacyclic codes over group algebras. Based on these codes we obtained some quantum codes with good parameters.

Keywords : Constacyclic codes, Linear codes, Quantum codes

General area of research : Mathematics
ID–ICFAS2016: 1164

On the Bezier directrix curves of two developable ruled surfaces

Vahide Bulut and Ali Caliskan

Department of Mathematics, Faculty of Science, Ege University, Izmir, Turkey, vahidebulut@mail.ege.edu.tr

Abstract

Developable ruled surfaces are widely used in Computer Aided Geometric Design (CAGD) such as surfaces of marine craft and aircraft skins, garment design and architectural structures since these surfaces can be unfolded (developed) into a plane without stretching or tearing. In this paper, we present obtaining the nearest neighbor Bezier directrix curve of a developable ruled surface from the Bezier directrix curve of the other developable ruled surface and the exchange variations of the arc lengths of these Bezier directrix curves. Therefore, the optimum Bezier curve and also by using this curve, the optimum developable ruled surface can be obtained that user wants. Also, we expressed relation between the spherical images of these developable ruled surfaces and the inflection curve using SLERP.

Keywords: Developable ruled surface, Bezier curve, Variation, Inflection curve, SLERP

General area of research: Mathematics
A comparison theorem for Cesàro and Abel methods of summability of sequences of fuzzy numbers

Enes Yavuz

Department of Mathematics, Celal Bayar University, Manisa, Turkey,
enes.yavuz@cbu.edu.tr

Abstract

In this study we give an optimal bound for Cesàro summable sequences of fuzzy numbers and prove a comparison theorem between Cesàro and Abel methods of summability of sequences of fuzzy numbers. A Mertens’ type result concerning multiplication of series of fuzzy numbers is also obtained.

Keywords: Cesàro summability method, Inclusion theorems, Fuzzy set theory

General area of research: Mathematics
On weakly prime fuzzy ideals of commutative rings

Deniz Sonmez\textsuperscript{1} and Gursel Yesilot\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, dnzguel@hotmail.com
\textsuperscript{2}Department of Mathematics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, gyesilot@yildiz.edu.tr

Abstract

In this work, we introduce the weakly prime fuzzy ideals of a commutative ring with non-zero identity. We define a nonconstant fuzzy ideal $\mu$ of $R$ to be weakly prime if $0_t \neq x_y z_s \in \mu$ implies $x_r \in \mu$ or $y_s \in \mu$ for all $t \in (0, \mu(0)]$. Some properties of weakly prime fuzzy ideals are considered. For example, we show that if $\mu(0) = 1$ then $\mu$ is a weakly prime fuzzy ideal if and only if $\mu_s$ is a weakly prime ideal and $|\text{Im}\mu| = 2$. Also we examine the relation between weakly prime ideals and weakly prime fuzzy ideals of commutative rings.

\textbf{Keywords} : Weakly prime fuzzy ideal
\textbf{General area of research} : Mathematics
Numerical solution of fractional elliptic PDEs by the collocation method

FUAT USTA

Department of Mathematics, Düzce University, Konuralp Campus, 81620, Düzce, Turkey,
fuatusta@duzce.edu.tr

Abstract

In this presentation a numerical solution for the solution of fractional order of elliptic partial differential equation in $\mathbb{R}^2$ is proposed. In this method we use the Radial basis functions (RBFs) method to benefit the desired properties of mesh free techniques such as no need to generate any mesh and easily applied to multi dimensions. In the numerical solution approach the RBF collocation method is used to discrete fractional derivative terms with the Gaussian basis function. The numerical examples two dimensional cases are presented and discussed, which conform well with the corresponding exact solutions.

Keywords: Conformable fractional derivative, Elliptic partial differential equations, Radial basis functions, Collocation technique

General area of research: Mathematics
On generalization of Sturmn’s theorems for conformable differential equations

Mehmet Zeki Sarikaya¹ and Fuat Usta²

¹Department of Mathematics, Duzce University, Konuralp Campus, 81620, Duzce, Turkey, sarikayamz@gmail.com
²Department of Mathematics, Duzce University, Konuralp Campus, 81620, Duzce, Turkey, fuatusta@duzce.edu.tr

Abstract

In this presentation we propose and test the more general comparison theorems for conformable fractional differential equations. Then by using this the generalization of Sturm’s separation and Sturm’s comparison theorems we prove some inequalities for conformable integrals. The results presented here would provide generalizations of those given in earlier works. The numerical experiments is also provided to confirm the proposed theorem.

Keywords : Sturm’s theorems, Conformable fractional integrals

General area of research : Mathematics
Zero-sum games with fuzzy goal

Adem C. Cevikel

Department of Mathematics Education, Yildiz Technical University, Istanbul
34220, Turkey,
acevikel@yildiz.edu.tr

Abstract

In this study we consider two-person zero-sum games with fuzzy goal. For any pair of strategies \((x, y)\), a membership function \(m(x, y)\) of a fuzzy goal, which is a function of an expected payoff \(xAy\), is represented as \(m(xAy)\). We assume that the membership function for the fuzzy goal \(m(xAy)\) is a linear function and consider a method for computing a maximin solution with respect to a degree of attainment of a fuzzy goal.

Keywords: Fuzzy goal, Maximin solution, Two-person zero-sum game

General area of research: Mathematics
Elasto–plastic deformation of an incompressible bending plate with clamped boundary

Feda Ilhan\textsuperscript{1} and Zahir Muradoglu\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Abant Izzet Baysal University, Bolu, 14280, Turkey, direnfeda@gmail.com
\textsuperscript{2}Department of Mathematics, Kocaeli University, Kocaeli, Turkey, zahir@kocaeli.edu.tr

Abstract

In this study, the bending problem of an elasto–plastic and homogeneously isotropic incompressible plate is studied. It is assumed that the plate with thickness $h$ is placed in to the coordinate system $Ox_1x_2x_3$ such that the middle surface of the plate is located in $Ox_1x_2$ plane. The plate is supposed to be in equilibrium under the action of the loads applied on the upper surface of the plate in the $x_3$ axis direction, while its lower surface is free. It is known from the deformation theory of plasticity that as $w = w(x)$ being the deflection of a point $x \in \Omega$ on the middle surface of the plate, which is placed in the region $\Omega = (x_1, x_2) \in R^2 : 0 \leq x_\alpha \leq I_\alpha$, $\alpha = 1, 2$, satisfies the following nonlinear biharmonic equation:

\[
\frac{\partial^2}{\partial x_1^2} \left[ g(\xi^2(w)) \left( \frac{\partial^2 w}{\partial x_1^2} + \frac{1}{2} \frac{\partial^2 w}{\partial x_2^2} \right) \right] + \frac{\partial^2}{\partial x_1 \partial x_2} \left[ g(\xi^2(w)) \left( \frac{\partial^2 w}{\partial x_1 \partial x_2} \right) \right] + \frac{\partial^2}{\partial x_2^2} \left[ g(\xi^2(w)) \left( \frac{\partial^2 w}{\partial x_2^2} + \frac{1}{2} \frac{\partial^2 w}{\partial x_1^2} \right) \right] = F(x), \quad x \in \Omega \subset R^2, \quad w(x) = \frac{\partial w}{\partial n}(x) = 0
\]

A numerical solution for the boundary value problem related to the fourth order nonlinear PDE for a bending plate with clamped boundary condition by using finite difference method is obtained. The test function

\[
w(x_1, x_2) = (1 - \cos 2\pi x_1)(1 - \cos 2\pi x_2)
\]

which is satisfying clamped boundary condition on the boundary is used for
verifying the applicability of the computer program. Accuracy of the approximate solutions of numerical examples showed effectiveness of the given approach.

**Keywords**: Elasticity, Plasticity, Deformation theory, Nonlinear biharmonic equation

**General area of research**: Mathematics
Multi-fault detection of ball bearings in rotating machinery using Fisher linear discriminant analysis

Onur Kilinc

Abstract

Detection of multi-class faults, which is subjected to vibro-diagnostics, has always been a challenging job due to problems in dynamical modelling and maintaining significant efficiency. This study examines two feature extraction methods that prove its efficiency in roller element related faults. The database which allows investigation of multi-faults of is provided by Bearing Data Center of Case Western Reserve University (CWRU). Throughout the research, raw signal classification is performed against the feature extraction methods; Wavelet Packet Energy (WPE), Time-domain features (TDFs) on the accelerometer based vibration signal of deep groove ball bearing type 6205-2RS JEM. In the experiments, total of nine different health case; healthy case (HC) two severity levels of ball faults (BF), three severity levels of inner (IRF) and outer race faults (ORF) are classified using the multi-level feature vectors of proposed methods and Fisher Linear Discriminant Analysis (FLDA) with six-fold cross validation. As a non-model based method, proposed algorithm allows obtaining remarkable results in comparison with raw signal classification. Final results show that an average classification accuracy of 96.7% is achieved in nine-class classification, which includes severity levels and specificity of the health condition of ball bearings at the same time, which is promising. This research is considered to be essential for the specialist that works in area of rotating machinery which allows real-time condition monitoring of other non-stationary applications with not only its simplicity but also its efficiency.

Keywords: Wavelet packet energy, Time-domain features, Bearing fault diagnosis, Fisher linear discriminant analysis

General area of research: Mathematical and Statistical Sciences
Dual semi-quaternions and planar motions

Murat Bekar

Department of Mathematics, Necmettin Erbakan University, Konya, Turkey, mbekar@konya.edu.tr

Abstract

In this study, the algebra of dual semi-quaternions is introduced with some of its fundamental algebraic properties. Moreover, the planar motions in three-dimensional dual–space are defined by using the set of dual semi-quaternions.

Keywords : Semi-quaternions, Dual semi-quaternions, Planar motions

General area of research : Mathematics
Abstract

In recent times, fixed point theory in metric spaces has attracted a considerable attention from mathematicians due to various applications in areas such as analysis, engineering, computer science and approximation theory. Banach contraction principle can be considered as the most useful tool to solve important problems in some areas of mathematics. In this study, we present $C^*$—algebra-valued $G$—metric spaces. Moreover, we prove the Banach contraction principle in this space. At the end of the work, we give an application for our main result.

**Keywords**: Fixed point, Banach contraction principle, $G$—metric space, $C^*$—algebra

**General area of research**: Mathematics
Some properties of $m$–spotty Rosenbloom–Tsfasman spaces

Merve Bulut Yilgor and Vedat Siap

Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, mbyilgor@hotmail.com

Abstract

Coding theory plays an important role in efficient transmission of data over noisy channel. Spotty byte error control codes are very effective for detecting/correcting errors in semiconductor systems using recent high-density RAM chips with I/O data, e.g., 8, 16, or 32 bits I/O data. A spotty byte error is defined as random $t$–bit errors in byte of length $b$–bit, where $t \leq b$ and also $m$-spotty byte error is defined as multiple spotty byte errors in a byte. In this study, we investigate bounds to obtain good product $m$–spotty byte error control codes on the Rosenbloom–Tsfasman Spaces.

Keywords: Linear codes, $m$–spotty Rosenbloom-Tsfasman spaces

General area of research: Mathematics
ID–ICFAS2016: 1185

Spectral theory of a quantum difference equation with hyperbolic eigenparameter

YELDA AYGAR

Department of Mathematics, Ankara University, Ankara, 06100, Turkey,
yaygar@science.ankara.edu.tr

Abstract

The aim of this work is to get some spectral properties of the eigenvalues and spectral singularities of a boundary value problem with hyperbolic eigenparameter under a specific condition.

Keywords : $q$–difference equation, Spectral singularity, Eigenvalue, Spectral theory

General area of research : Mathematics
Some properties of $2$–absorbing hyperideals of Krasner hyperring

Elif Ozel Ay$^1$ and Gursel Yesilot$^2$

$^1$Department of Mathematics, Yildiz Technical University, elif-ozel@hotmail.com
$^2$Department of Mathematics, Yildiz Technical University, gyesilot@yildiz.edu.tr

Abstract

In this study we want to identify $2$–absorbing hyperideal on commutative hyperrings. Firstly, we define $2$–absorbing hyperideal which is a generalisation of prime hyperideal. Then we show some important properties of $2$–absorbing hyperideals which is associated with prime hyperideals and hyperideals.

Keywords : Krasner hyperring, Hyperideal, $2$–absorbing ideal, Prime ideal

General area of research : Mathematics
Unit dual sphere and tangent bundle of unit $2-$sphere

Murat Bekar$^1$ and Yusuf Yayli$^2$

$^1$Department of Mathematics, Necmettin Erbakan University, Konya, Turkey, mbekar@konya.edu.tr

$^2$Department of Mathematics, Ankara University, Ankara, Turkey, yayli@science.ankara.edu.tr

Abstract

In this study, firstly some basic concepts of dual numbers, dual vectors and tangent bundle of unit 2−sphere will be recalled. Afterwards, an isomorphism between the tangent bundle of unit 2−sphere and unit dual sphere will be given.

**Keywords** : Dual–number, Unit dual sphere, Tangent bundle

**General area of research** : Mathematics
Pullback cat\(^1\) racks

**Hatice Gulsun Akay\(^1\) and I. Ilker Akca\(^2\)**

\(^1\)Department of Mathematics and Computer Science, Faculty of Science and Letters, Eskisehir Osmangazi University, Turkey, hgulsun@ogu.edu.tr

\(^2\)Department of Mathematics and Computer Science, Faculty of Science and Letters, Eskisehir Osmangazi University, Turkey, iakca@ogu.edu.tr

**Abstract**

In this study we review the notion of Cat\(^1\) racks and construct the pullback Cat\(^1\) rack by using the universal property of pullback diagram; with some essential examples of it. This notion will generalizes the pullback Cat\(^1\) groups; in the sense of the conjugation functor \(\text{Conj}: \text{Grp} \to \text{Rack}\).

**Keywords**: Rack, Cat\(^1\) rack

**General area of research**: Mathematics
Id–ICFAS2016: 1195

On primes of the form $4k + 1$ and $k$–Fibonacci numbers

NihaL Yilmaz ozgur1 and oznur oztunc kaymak2

1 Department of Mathematics, Balikesir University, 10145, Balikesir, Turkey, nihal@balikesir.edu.tr
2 Department of Mathematics, Balikesir University, 10145, Balikesir, Turkey, oztunc@balikesir.edu.tr

Abstract

In this talk we give two new equations related to the sums of the squares of the first $n$ $k$–Fibonacci and $k$–Lucas numbers. On the other hand the problem of existing infinitely many primes $p$ such that $p \equiv 1 \pmod{4}$ of elementary number theory is studied directly from the properties of $k$–Fibonacci numbers.

Keywords : $k$–Fibonacci numbers, $k$–Lucas numbers

General area of research : Mathematics
Spherical indicatrices of involute of a space curve in euclidean 3–space

YILMAZ TUNCER$^1$ and SERPIL UNAL$^2$

$^1$Department of Mathematics, Faculty of Science and Arts, Usak University, Usak, Turkey, yilmaz.tuncer@usak.edu.tr

$^2$Department of Mathematics, Faculty of Science and Arts, Usak University, Usak, Turkey, serpil.unal@usak.edu.tr

Abstract

In this work, we studied the properties of the spherical indicatrices of involute curve of a space curve and presented some characteristic properties in the cases that involute curve and evolute curve are slant helices and helices, spherical indicatrices are slant helices and helices and we introduced new representations of spherical indicatrices.

Keywords : Involute curve, Evolute curve, Helix, Slant helix, Spherical indicatrix

General area of research : Mathematics
Trigonometric approximation in weighted Lorentz spaces by Cesàro submethod

Ahmet Hamdi Avsar¹ and Yunus Emre Yildirir²

¹Department of Mathematics, Necatibey Education Faculty, Balikesir University, Balikesir, Turkey, ahmet.avsar@balikesir.edu.tr
²Department of Mathematics, Necatibey Education Faculty, Balikesir University, Balikesir, Turkey, yildirir@balikesir.edu.tr

Abstract

In this study, the degree of approximation to functions belongs to weighted Lorentz spaces is estimated by $C_\lambda$ method obtained as a transformation that yields a subsequence of the Cesàro summability method $C_1$. Particularly, we investigated degree of approximation of $f$ belongs to weighted Lorentz spaces by trigonometric polynomials $N_n^\lambda$ and $R_n^\lambda$.

Keywords: Weighted Lorentz space, Trigonometric approximation, Cesàro submethod, Muckenhoupt weight

General area of research: Mathematics
Some generalized inequalities for \((\alpha, m)\)–convex functions

**Mehmet Eyup Kiris** and **Naki Caltiner**

*Department of Mathematics, Faculty of Science and Arts, Afyon Kocatepe University, Afyonkarahisar, Turkey, kiris@aku.edu.tr*

**Abstract**

In this paper, some Hermite-Hadamard’s type integral inequalities will be given by using \((\alpha, m)\)–convex functions. Our results presented here would provide extensions of those given in earlier works.

**Keywords** : Hermite–Hadamard’s inequality, \((\alpha, m)\)–convex functions, Mid-point formula

**General area of research** : Mathematics
Propagation of love waves on a half space covered by a layer of slowly varying thickness

Ekin Deliktas¹ and Mevlut Teymur²

¹Department of Engineering Mathematics, Faculty of Sciences and Letters, Istanbul Technical University, edeliktas@itu.edu.tr
²Department of Engineering Mathematics, Faculty of Sciences and Letters, Istanbul Technical University, teymur@itu.edu.tr

Abstract

In this study, propagation of Love waves on an elastic half space coated with a layer of slowly varying thickness is examined. The half space and layer are assumed to be homogeneous, isotropic, elastic and having different mechanical properties. It is assumed that free surface and interface change as a function of the distance in the direction of propagation of the Love waves. By employing the method of multiple scales, we seek the effect of layer thickness varying on the different scales on the propagation characteristics of Love waves. The phase velocity and group velocity of Love waves have been obtained for special types of irregularities.

Keywords: Love wave, Irregular boundary surface

General area of research: Mathematics, Geophysics, Seismology
Diagnosis of diabetes risk by using artificial neural networks

Umut Ozkaya¹ and Levent Seyfi²

¹Department of Electrical and Electronics Engineering, Selcuk University, Konya, Turkey,
  uozkaya@selcuk.edu.tr

²Department of Electrical and Electronics Engineering, Selcuk University, Konya, Turkey,
  leventseyfi@selcuk.edu.tr

Abstract

In this study, the most commonly encountered risk of diabetes is aimed to be detected by using artificial neural network with patient data. In the research, diabetes is wanted to be diagnosed by using 7 different parameters of 50 people. Diabetes has major factors on determining the risk of disease which are gender, age, LDL, HDL, BMI, smoking and hereditary characteristics. The data was generated by means of the knowledge and experience of experts and dietitians. 66 percentage of the data was used for training the neural network while its 34 percentage was selected as the test data. Thanks to Some of artificial neural network models which are forward feed propagation, Levenberg-Marquardt and Elman network, their performance is compared with each other.

Keywords : Diabetes, Artificial neural networks, Matlab

General area of research : Mathematics
The Galerkin finite element method for advection diffusion equation

Melis Zorsahin Gorgulu¹ and Dursun Irk²

¹Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, mzorsahin@ogu.edu.tr
²Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, dirk@ogu.edu.tr

Abstract

We consider the following one dimensional advection diffusion equation in a restricted solution domain over a space/time interval \([a, b] \times [0, T]\):

\[ u_t + \alpha u_x - \mu u_{xx} = 0, \]

with the initial condition

\[ u(x, 0) = f(x), \ a \leq x \leq b \]

and the boundary conditions

\[ u(a, t) = u(b, t) = 0. \]

In this study, cubic \(B\)-spline Galerkin finite element method, based on second and fourth order single step methods for time integration is proposed for numerical solution of the advection diffusion equation. Second order single step method is also known as Crank Nicolson method. Two numerical examples are studied to illustrate the accuracy and the efficiency of the method. The numerical results of this study demonstrate that the proposed fourth order single step method is a remarkably successful numerical technique for solving the advection diffusion equation.

Keywords: Cubic \(B\)-spline, Advection diffusion equation, Galerkin method

General area of research: Mathematics
Sub–manifold and traveling wave solutions of Ito’s 5th–order mKdV equation

LIJUN ZHANG, HAIXIA CHANG, AND CHAUDRY MASOOD KHALIQUE

International Institute for Symmetry Analysis and Mathematical Modelling, Department of Mathematical Sciences, North-West University, Mafikeng Campus, Private Bag X 2046, Mmabatho, 2735, South Africa, li-jun0608@163.com

Abstract

In this talk, we study Ito’s 5th–order mKdV equation with the aid of symbolic computation system and by qualitative analysis of planar dynamical systems. We show that the corresponding higher–order ordinary differential equation of Ito’s 5th–order mKdV equation, for particular values of the parameter, possesses some sub–manifolds defined by planar dynamical systems. Some solitary wave solutions, kink and periodic wave solutions of the Ito’s 5th–order mKdV equation for these particular values of the parameter are obtained by studying the bifurcation and solutions of the corresponding planar dynamical systems.

Keywords: Ito’s 5th-order mKdV equation, Travelling wave solutions, Sub–manifold, Planar dynamical systems

General area of research: Mathematics
On totally umbilical STCR–lightlike submanifolds

Burcin Dogan¹, Bayram Sahin², and Erol Yasar³

¹Department of Mathematics, Faculty of Science, Mersin University, Mersin, Turkey, bdogan@mersin.edu.tr
²Department of Mathematics, Inonu University, Malatya, Turkey, bayram.sahin@inonu.edu.tr
³Department of Mathematics, Faculty of Science, Mersin University, Mersin, Turkey, yerol@mersin.edu.tr

Abstract

In this study, we present a new class of lightlike submanifolds, namely, Screen Transversal Cauchy Riemann (STCR)–lightlike submanifolds, of indefinite Kaehler manifolds. Firstly, we show that this new class is an umbrella of screen transversal lightlike, screen transversal totally real lightlike and CR-lightlike submanifolds and give an example of a STCR lightlike submanifold. Then, we investigate the existence of totally umbilical (STCR)–lightlike submanifolds and finally, we give an example.

Keywords : Lightlike submanifolds, Totally umbilical submanifolds, Kaehler manifolds

General area of research : Mathematics
New exact solutions of some nonlinear PDEs

adem cengiz cevikel

Department of Mathematics Education, Yildiz Technical University, 34220, Istanbul, Turkey,
acevikel@yildiz.edu.tr

Abstract

In this study we established exact solutions for some nonlinear partial differential equations. The tanh–coth method was used to construct solitary wave solutions of nonlinear evolution equations. This method presents a wider applicability for nonlinear wave equations.

Keywords: Exact solution, Tanh–coth method

General area of research: Mathematics
Construction of cyclic codes over a family of non–chain rings and applications to DNA

Aysegul Bayram¹, Elif Segah Oztas², Bahattin Yildiz, and Irfan Siap

¹Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, aaysegulbayram@gmail.com
²Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, esoztas@yildiz.edu.tr

Abstract

In this paper, we study linear and cyclic codes defined over a non-chain ring \( R_{k,v} := F_{4^{2k}}[v]/\langle v^4-v \rangle \) where \( k \geq 1 \). We give the necessary and sufficient conditions on determining algebraic structures of cyclic codes over \( R_{k,v} \). A distance preserving Gray map which induces a relation between codes over \( R_{k,v} \) and codes over \( F_{4^{2k}} \) is introduced. Further, the algebraic structure of reversible codes over \( R_{k,v} \) is studied. We obtain some DNA codes over \( R_{k,v} \) by solving the reversibility problem and introducing a matching between the ring elements and DNA 8–bases (8–mers).

Keywords : Non–chain ring, Reversible codes, DNA codes

General area of research : Mathematics
Solving the reversibility problem of the DNA codes with $k-$bases on cyclic codes over $F_2[u]/(u^{2^k} - 1)$

Elif Segah Oztas, Bahattin Yildiz, and Irfan Siap

Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, elifseghoztas@gmail.com

Abstract

In this study, we solve the reversibility problem with DNA $k-$bases on cyclic codes over the chain ring $F_2[u]/(u^{2^k} - 1)$ by an algebraic approach and present some examples. Reversible cyclic codes which correspond to reversible DNA codes and reversible complement DNA codes are studied.

Keywords: Cyclic codes, Chain rings, Reversible codes, DNA codes

General area of research: Mathematics

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Lie symmetry analysis of the stochastic interest rate models

Ahmet Bakkaloglu¹ and Burhaneddin Izgi²

¹Department of Mathematics, Mimar Sinan Fine Arts University, Istanbul, Turkey,
ahmetbakkaloglu@gmail.com

²Department of Mathematics, Istanbul Technical University, Turkey,
bizgi@itu.edu.tr

Abstract

The zero coupon bond pricing Ho–Lee stochastic interest rate models are solved using the invariant approach. The invariance criteria is employed on the linear (1 + 1) parabolic partial differential equations corresponding to the Ho–Lee model in order to perform reduction into one of the four Lie canonical forms. The invariant approach helps in transforming the partial differential equation representing the stochastic interest rate model into the first Lie canonical form which is the classical heat equation. We obtain the transformations which map this equation into the heat equation. We construct the fundamental solution for Ho–Lee model via these transformations by utilizing the well–known fundamental solutions of the classical heat equation. Finally, we analyze the effect of the drift term for the Ho–Lee stochastic interest rate model for various parameters. We also perform simulations and present some figures by using the numerical solution of stochastic differential equations.

Keywords: Differential equations, Stochastic interest rate models, Lie symmetry analysis, Heat equation, Canonical Lie forms, Numerical solution of stochastic differential equations

General area of research: Mathematics
The comparison of rough set theory (RST) and fuzzy set theory (FST) as granular computing method

MERT BAL AND GULSAH KOSE

Department of Mathematical Engineering, Yildiz Technical University, Istanbul, Turkey,
mertbal@yildiz.edu.tr

Abstract

Granular Computing (GrC) has received much importance in the last decades and it is applied to various fields. It represents a practical methodology for problem solving by real world problems and gives a new thinking to analyze, understand and represent problems. Many methods and models of granular computing have been proposed in the different studies. The two methods of granular computing are Rough Set Theory (RST) and Fuzzy Set Theory (FST). There are various applications of these methods in different fields, such as knowledge discovery, image processing, problem solving and semantic Web services. RST and FST are generalizations of classical set theory for uncertainty and vagueness. The two theories are models of different types of uncertainty. The RST copes with the approximation of sets under indiscernibility. The indiscernibility is typically characterized by an equivalence relation. Furthermore, the FST copes with the vague of the boundary of a class through a continuous generalization of set characteristic functions by allowing partial membership. These two theories are not the alternatives of each other but they complement each other.

In this study, we will give the basic concept of Rough Set Theory and Fuzzy Set Theory which are the methods of Granular Computing and compare these two methods.

Keywords : Granular computing, Rough set theory, Fuzzy set theory, Indiscernibility, Membership function

General area of research : Mathematics
Numerical analysis of convection–diffusion processes

Murat Sari\textsuperscript{1}, Lamyaa J. M. Al–Mashhadani\textsuperscript{2}, and Arshed A. Ahmad

\textsuperscript{1}Department of Mathematics, Faculty of Science and Art, Yildiz Technical University, 34210, Istanbul, Turkey, sarim@yildiz.edu.tr

\textsuperscript{2}Department of Mathematics, Faculty of Science and Art, Yildiz Technical University, 34210, Istanbul, Turkey, lamar_math@yahoo.com

Abstract

This article aims at presenting a discussion on numerical behavior of the convection–diffusion processes. To tackle this, some essential finite difference approaches are considered for both temporal and spatial variation. To be able to properly model the behavior of the physical processes of interest, the computed solutions have been analyzed in terms of the physical processes. The considered approaches are seen to be illustrative in figuring out these types processes.

\textbf{Keywords} : Convection–diffusion, Physical process, Finite difference, Modelling

\textbf{General area of research} : Mathematics
ID–ICFAS2016: 1246

Periodic and solitary wave solutions of nonlinear evolution equations

ADEM CENGIZ CEVIKEL

Department of Mathematics Education, Yildiz Technical University, Istanbul, 34220, Turkey,
acevikel@yildiz.edu.tr

Abstract

In this study, we present a functional variable method for finding periodic wave solutions and solitary wave solutions of nonlinear evolution equations in mathematical physics and engineering sciences. The proposed technique is tested on some nonlinear evolution equations.

Keywords: Functional variable method, Periodic wave solutions, Solitary wave solutions, Nonlinear evolution equations

General area of research: Mathematics
On mutually pseudo–orthogonal Latin squares

FATIH DEMIRKALE

Department of Mathematics, Faculty of Arts and Sciences, Yıldız Technical University, Istanbul, Turkey,
fatihd@yildiz.edu.tr

Abstract

Two Latin squares $L = [l(i,j)]$ and $M = [m(i,j)]$, of even order $n$ with entries $\{0, 1, 2, \ldots, n-1\}$, are said to be pseudo-orthogonal if the superimposition of $L$ on $M$ yields an $n \times n$ array $A = [(l(i,j), m(i,j))]$ in which each symbol in $L$ is paired with every symbol in $M$ precisely once, except for one symbol with which it is paired twice and one symbol with which it is not paired at all.

In this talk, I will discuss an upper bound for the maximum $\mu$ for which a set of $\mu$ cyclic mutually pseudo-orthogonal Latin squares (MPOLS) of order $n$ exists and give the values of $\mu$ for $n \leq 16$. Also, I will present direct constructions for the existence of general families of 3 cyclic MPOLS of some orders and settle the spectrum question for sets of 3 MPOLS of even order, for all but the order 146.

Keywords: Latin squares, Orthogonal Latin squares, Pseudo-orthogonal Latin squares, Quasi-difference sets

General area of research: Mathematics
Exact solutions of the Fisher–type equation with time–dependent coefficients

Ahmet Bekir
1, Ozkan Guner2, and Adem Cengiz Cevikel3

1Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, abekir@ogu.edu.tr

2Department of International Trade, Cankiri Karatekin University, 18100, Cankiri, Turkey, ozkanguner@karatekin.edu.tr

3Department of Mathematics Education, Yildiz Technical University, 34220, Istanbul, Turkey, acevikel@yildiz.edu.tr

Abstract

In this study, we studied the modified sine–cosine method and the ansatz method to derive exact solutions variable–coefficient Fisher–type equation. The soliton and periodic solutions and topological as well as the singular 1–soliton solution is obtained with the aid of the ansatz method.

These solutions are important for the explanation of some practical physical problems. The obtained results show that these methods provide a powerful mathematical tool for solving nonlinear equations with variable coefficients. Also, the constraint relation between these functions of variable t and coefficients are obtained.

Keywords : Modified sine–cosine method, Ansatz method, The variable–coefficient Fisher–type equation

General area of research : Mathematics
Exponential rational function method for solving nonlinear evolution equations

MELIKE KAPLAN\(^1\), MEHMET NACI OZER\(^2\), and AHMET BEKIR\(^3\)

\(^1\)Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, mkaplan@ogu.edu.tr

\(^2\)Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, mnozer@ogu.edu.tr

\(^3\)Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, abekir@ogu.edu.tr

Abstract

In the recent past, scientists have seen a considerable interest in the investigation of nonlinear processes. The reason for this is that they appear in various branches of natural sciences and particularly in almost all branches of physics: fluid dynamics, plasma physics, elastic media, field theory, nonlinear optics, control theory, systems identifications and condensed matter physics. With the development of soliton theory, various methods for obtaining the exact solutions of nonlinear partial differential equations (NPDEs) have been presented.

In this work, we have explored new applications of the exponential rational function method. The obtained solutions may be of significance for the explanation of some practical physical problems. The method is very reliable, easy and effective handling of the solution process of nonlinear evolution equations.

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Keywords: Exact solutions, Symbolic computation, The exponential rational function method

General area of research: Mathematics
The Auto-Bäcklund transformations for nonlinear evolution equations

Melike Kaplan¹, Ahmet Bekir², and Mehmet Naci Ozer³

¹Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, mkaplan@ogu.edu.tr
²Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, abekir@ogu.edu.tr
³Department of Mathematics–Computer, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, mnozer@ogu.edu.tr

Abstract

Nonlinear evolution equations (NLEEs) are significant mathematical models to describe physical phenomena in fluid mechanics, plasma waves, solid state physics, chemical physics. In order to understand the mechanisms of those physical phenomena, it is essential to analyze their solutions and properties.

By using an extension of the homogeneous balance method and Maple, the Auto–Bäcklund transformations are constructed new exact solutions for nonlinear evolution equations.

Keywords: Exact solutions, Auto–Bäcklund transformation, Nonlinear evolution equations

General area of research: Mathematics
A numerical solution of the reaction–diffusion systems

Abdullah Murat Aksoy\textsuperscript{1} and Idris Dag\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Polatli Faculty of Science and Arts, Gazi University, Ankara, Turkey, amurataksoy@gazi.edu.tr
\textsuperscript{2}Department of Mathematics and Computer, Faculty of Arts and Sciences, Eskisehir Osmangazi University, Eskisehir, Turkey, idag@ogu.edu.tr

Abstract

The numerical solutions of the Reaction–Diffusion Systems (RBS) are calculated using the Taylor collocation extended cubic B-spline method (TCEM). To discretize the RBS, Taylor series expansion and extended cubic B-spline functions are applied to temporal derivative terms and spatial derivative terms respectively. Obtained algebraic system is solved iteratively using Thomas algorithm.

The accuracy of the TCEM is measured by means of two test problems. The $L_2$ and $L_\infty$ error norms are calculated to compare the numerical results of the suggested method with known exact solution to the first test problem and the relative errors are calculated to the second test problem. Computed results are compatible with the other numerical solutions in the literature. So we can say that the TCEM is an useful method to the numerical solution of the RBS.

\textbf{Keywords} : Taylor series, Collocation method, Extended cubic $B$–spline functions, Reaction–diffusion systems

\textbf{General area of research} : Mathematics
A Taylor collocation method for the nonlinear Schrödinger equation

A. M. Aksoy and I. Dag

1 Department of Mathematics, Polatli Faculty of Science and Arts, Gazi University, Ankara, Turkey, amurataksoy@gazi.edu.tr
2 Department of Mathematics and Computer, Faculty of Arts and Sciences, Eskisehir Osmangazi University, Eskisehir, Turkey, idag@ogu.edu.tr

Abstract

In this study, the Taylor collocation extended cubic \( B \)-spline method (TCEM) is introduced to obtain the numerical solutions of the Nonlinear Schrödinger Equation (NLS). Taylor series expansion is used to discretize the time derivative parts in the equation and the extended cubic \( B \)-spline functions are applied to spatial discretization.

Five numerical examples are given to confirm the robustness of the presented method. Accuracy of the method is discussed by computing \( L_2 \) and \( L_\infty \) error norms. Conserved quantities are computed accurately. Obtained results are in good agreement with exact solutions. However using the TCEM takes a lot of time.

As a result we can say that the TCEM is an effective method for solving the NLS.

Keywords: Taylor series, Collocation method, Extended cubic \( B \)-spline functions, Nonlinear Schrödinger equation

General area of research: Mathematics
ID–ICFAS2016: 1275

On the linearization of Ermakov–Pinney equation via generalized Sundman transformation

OZLEM ORHAN\textsuperscript{1} and TEOMAN OZER\textsuperscript{2}

\textsuperscript{1}Department of Mathematical Engineering, Faculty of Science and Letters, Istanbul Technical University, Istanbul, 34469, Turkey, orhanozlem@itu.edu.tr
\textsuperscript{2}Division of Mechanics, Faculty of Civil Engineering, Istanbul, 34469, Turkey, tozer@itu.edu.tr

Abstract

We discuss nonlocal symmetries and corresponding conservation laws of the Ermakov–Pinney equation. Firstly, we obtain nonlocal symmetries of Ermakov–Pinney equation by Sundman transformation. Then we obtain first integral using nonlocal symmetries and moreover we find exact solutions of Ermakov–Pinney equation. These first integrals and exact solutions are classified with respect to different choices of external potential function.

Keywords: First integral, Sundman transformation, Nonlocal symmetries, Classification

General area of research: Mathematics
Analysis of relation between convex function and starlike function

**Oya Mert**\(^1\), Ismet Yıldız\(^2\), Hasan Sahin\(^3\), and Hilal Ay\(^4\)

\(^1\)Department of Mechanical Engineering, Istanbul Kemerburgaz University, Turkey, oya.mert@kemerburgaz.edu.tr
\(^2\)Department of Mathematics, Duzce University, Turkey, ismetyildiz@duzce.edu.tr
\(^3\)Department of Mathematics, Duzce University, Turkey, hasansahin13@gmail.com
\(^4\)Department of Mathematics, Duzce University, Turkey, h.hilalay92@gmail.com

**Abstract**

In this paper, \(a_k\) coefficients previously obtained for starlike functions are now examined for \(0 \leq \alpha < 1\) in \(f(z) \in A\) such that

\[
\sum_{k=1}^{\infty} \left\{ |k - u_k| + (1 - \alpha)|u_k| \right\} \left| \frac{a_{n+1}}{a_2} \right| \leq 1 - \alpha
\]

If this summation is provided for the function on this range, then it is also provided with \(f(z) \in K\) when it is \(f(z) \in S(\alpha, t)\).

**Keywords** : Starlike function, Convex function, Analytic function, Extremal function

**General area of research** : Mathematics
New type of variational iteration method for fractional differential equations

OMER FIRAT$^1$, MUAMMER AYATA$^2$, OMER ACAN$^3$, AND GALIP OTURANC$^4$

$^1$Department of Mathematics, Faculty of Arts and Science, Kilis 7 Aralik University, Kilis, Turkey, ofirat27@gmail.com

$^2$Department of Mathematics, Science Faculty, Selcuk University, Konya, Turkey, m.ayata@selcuk.edu.tr

$^3$Department of Mathematics, Faculty of Arts and Science, Siirt University, Siirt, Turkey, omeracan@yahoo.com

$^4$Department of Mathematics, Science Faculty, Selcuk University, Konya, Turkey, goturanc@selcuk.edu.tr

Abstract

In this presentation, we define new version type of variational iteration method (C–VIM) based on the newly defined fractional derivative called conformable fractional derivative. Then this method applied to non–linear fractional order ordinary differential equations (FODEs). Solutions by using C–VIM will compare with classical variational iteration (VIM) and some other numerical methods. Finally, solutions are illustrated by graphics and tables to show the efficiency of the new technique.

Keywords : Fractional derivative, Conformable derivative, Variational iterative method, Fractional order ODEs

General area of research : Mathematics
The Soft Isbell Topology with some applications

GOZDE YAYLALI\textsuperscript{1} AND BEKIR TANAY\textsuperscript{2}

\textsuperscript{1}Mugla Sitki Kocman University, Mugla, Turkey, gozdeyaylali@mu.edu.tr
\textsuperscript{2}Mugla Sitki Kocman University, Mugla, Turkey, btanay@mu.edu.tr

Abstract

Classical mathematical tools are inadequate to deal with uncertainties of the complicated problems in economics, engineering and enviromental areas. To deal with these uncertainties, Soft Set Theory was introduced by Molodtsov in 1999. According to improvements in soft set theory Tanay and Yaylalı gave the definition of Soft Scott Topology by using orderings on soft sets in 2014.

In this study, we examined soft function spaces. By using soft Scott topology and soft continuos functions, we obtain Soft Isbell Topology and we gave same applications about the Soft Isbell Topology.

Keywords : Soft set, Soft Topology, Soft continuous function, Soft Scott Topology, Soft Isbell Topology

General area of research : Mathematics
Exponential $B$–splines Galerkin method for the numerical solution of the Fisher’s equation

**Melis Zorsahin Gorgulu**$^1$ and **Idris Dag**$^2$

$^1$Department of Mathematics–Computer, Faculty of Arts and Sciences, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, mzorsahin@ogu.edu.tr

$^2$Department of Mathematics–Computer, Faculty of Arts and Sciences, Eskisehir Osmangazi University, 26480, Eskisehir, Turkey, idag@ogu.edu.tr

**Abstract**

In this paper, the exponential $B$–spline functions are used to construct the Galerkin finite element method for the numerical solution of the Fisher’s equation. Two numerical examples are studied to illustrate the accuracy and the efficiency of the method. Obtained results are compared with some early studies.

**Keywords** : Exponential $B$–splines, Galerkin finite element method, Fisher’s equation

**General area of research** : Mathematics
Pro-$\mathcal{C}$ completions of crossed modules of commutative algebras

Mahmut Kocak\textsuperscript{1} and Hatice Gulsun Akay\textsuperscript{2}

\textsuperscript{1}Department of Mathematics and Computer Science, Faculty of Science and Letters, Eskisehir Osmangazi University, Turkey, mkocak@ogu.edu.tr

\textsuperscript{2}Department of Mathematics and Computer Science, Faculty of Science and Letters, Eskisehir Osmangazi University, Turkey, hgulsun@ogu.edu.tr

Abstract

Profinite crossed modules are firstly defined by Kokers and Porter. They also examined the Pro-$\mathcal{C}$ completion of crossed modules for $\mathcal{C}$, a full class of finite groups. In this work we study relations between crossed modules of commutative $k$-algebras and Pro-$\mathcal{C}$ crossed modules for $\mathcal{C}$, a full class of finite $k$-algebras. Furthermore, we show that there is a Pro-$\mathcal{C}$ completion functor defined on the category of crossed modules. Also the relationship between the Pro-$\mathcal{C}$ completion of $(C, R, \partial)$, which denoted by $(\widehat{C}, \widehat{R}, \widehat{\partial})$ and the Pro-$\mathcal{C}$ completion of $C, R$ as $k$-algebras is studied. Finally we study the Pro-$\mathcal{C}$ completion of a free crossed module.

Keywords: Pro-$\mathcal{C}$ crossed modules, Pro-$\mathcal{C}$ completion, Free pro-$\mathcal{C}$ completion

General area of research: Mathematics
Tobit regression for modeling gastric cancer

ISMAIL YENİMLEZ$^1$ AND YELİZ MERT KANTAR$^2$

$^1$Department of Statistics, Faculty of Science, Anadolu University Eskisehir, 26210, Turkey, ismailyenilmmez@anadolu.edu.tr

$^2$Department of Statistics, Faculty of Science, Anadolu University Eskisehir, 26210, Turkey, ymert@anadolu.edu.tr

Abstract

Limited dependent variable is a general concept that includes censored, truncated data and also discrete outcomes such as binary decisions or qualitative data restricted to a small number of categories. One of the well-known models for limited dependent variable is the tobit regression model or the censored regression model. The tobit regression models linear relationships between variables when dependent variable is censored. In this study, tobit regression analysis is applied to a numerical example which includes a data of gastric cancer patients. The estimation values and statistical results obtained for the gastric cancer patients’ data are presented. Significant variables are determined and alternative estimation methods are discussed.

Keywords: Limited dependent variable models, Tobit regression, Censored data, Gastric cancer

General area of research: Mathematics
ID–ICFAS2016: 1286

On congruences with the terms of sequences and \( \{ W_n \} \)
and \( \{ X_n \} \)

Sibel Koparal\(^1\) and Nese Omur\(^2\)

\(^1\)Department of Mathematics, Kocaeli University, Kocaeli, Turkey, sibel.koparal@kocaeli.edu.tr

\(^2\)Department of Mathematics, Kocaeli University, Kocaeli, Turkey, neseomur@kocaeli.edu.tr

Abstract

Define the sequence \( \{ W_n \} \) by \( W_n = rW_{n-1} + W_{n-2} \) with \( W_0 = a, W_1 = b \)
for all integers \( n \) and the sequence \( \{ X_n \} \) via the terms of sequence \( \{ W_n \} \) as
\( X_n = W_{n+1} + W_{n-1} \). The means of the terms of these sequences, we give
some congruences involving harmonic numbers.

Keywords : Congruences, Harmonic numbers and sequences

General area of research : Mathematics
A study on existence theorem of optimal control for nonlinear sequential dynamic systems

Muhammet Candan

Canakkale Onsekiz Mart University, Terzioglu Campus, Canakkale, 17100, Turkey,
mcanidan@comu.edu.tr

Abstract

This paper deals with optimal control problem for processes governed by nonlinear sequential dynamic systems. The aim of this study is to investigate multistep discrete optimal control problem. Accessible set is defined in order to indicate existence of optimal control under the assumption of the unique solution condition. Optimal control problem is converted to finding minimal value of pseudo Boolean functional with the help of accessible set. Finally, considering these facts, the existence theorem of optimal control is proven as well.

Keywords: Optimal control, Nonlinear sequential dynamic system, Accessible set, Boolean functional

General area of research: Mathematics
Pseudo-cyclic codes with applications to DNA

SUMEYRA BEDIR¹, ELIF SEGAH OZTAS², AND IRFAN SIAP

¹Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, sbedir@yildiz.edu.tr
²Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, elifsegahoztas@gmail.com

Abstract

The interest on DNA computing was initiated once DNA property was used to solve an NP–complete problem. It is well–known that whenever it reproduces, errors may occur and DNA, due to its structural properties, can detect such errors and control them. Reproduction and similar activities in DNA take places in a huge amount and this error control capability of the DNA has attracted many researchers in coding theory. In this direction algebraic codes that resemble the DNA structure so called DNA codes are constructed in many aspects and have been studied intensively. Many researchers have focused on codes with specific properties (reversible, reversible–complement) and studied their structures.

Pseudo–cyclic codes over finite fields, as a generalization of linear cyclic and constacyclic codes, are shown to be useful in terms of constructing long–length and optimal linear codes directly. These codes are linear codes different from cyclic (though they can be considered as shortened cyclic codes) or consta-cyclic codes and they enjoy an algebraic structure. This algebraic structure gives a hand to explore this family of linear codes.

In this study, we introduce the construction of pseudo–cyclic reversible DNA codes by means of \(4^k\)-lifted polynomials and we give some promising examples of these codes which are MDS and satisfy the Griesmer bound.

Keywords : Pseudo–cyclic codes, Reversible codes, DNA codes

General area of research : Mathematics
A $\mathbb{Z}_2$—graded quantum plane and its differential calculus

MUTTALIP OZAVSAR

Department of Mathematics, Yildiz Technical University, Istanbul, Turkey,
mozavsar@yildiz.edu.tr

Abstract

The quantum plane of Manin is identified with a noncommutative algebra whose generators $x$ and $y$ hold the $q$-commutative relation $xy = qyx$ for a nonzero complex parameter $q$. Wess and Zumino introduced the noncommutative differential calculus on such quantum spaces. In this study, we present a $\mathbb{Z}_2$—graded quantum plane and its differential calculus.

Keywords: Quantum plane, Graded algebras, Differential calculus

General area of research: Mathematics
A smash product algebra on the h-deformed quantum plane

Muttalip Ozavsar

Department of Mathematics, Yildiz Technical University, Istanbul, Turkey,
mozavsar@yildiz.edu.tr

Abstract

The h-deformed quantum plane is associated with an algebra generated by $x$ and $y$ which satisfy the commutation relation $xy = yx + hy^2$. A smash product algebra and some relevant algebraic properties on the h-deformed quantum plane are introduced.

Keywords: Quantum Plane, Graded Algebras, Differential Calculus, Quantum Groups

General area of research: Mathematics
On the inversion of a generalized radon transform

ZEKERIYA USTAOGLU

Department of Mathematics, Faculty of Arts and Sciences, Bulent Ecevit University, Zonguldak, Turkey, zekeriyaustaoglu@beun.edu.tr

Abstract

We consider a generalized Radon transform (GRT) that integrates a function $f(x_1, x_2)$ on $\mathbb{R}^2$ over a family of curves $x_2 = u + s\varphi(x_1 - c)$ with respect to the variable $x_1$, for a real valued continuous function $\varphi$ on $\mathbb{R}$, $u, s \in \mathbb{R}$ and a fixed $c \in \mathbb{R}$. This transform can be regarded as a generalization of the slant-stack transform in seismology.

We investigate the inversion of the GRT via the inversion of the regular Radon transform. Depending on some conditions on $f$ and $\varphi$, we obtain some back-projection type inversion formulas.

Keywords : Generalized Radon transform, Integral geometry, Inversion formula

General area of research : Mathematics
ID–ICFAS2016: 1298

Permanent relation between Padovan numbers and Hessenberg matrix

MERAL YASAR

Department of Mathematics, Faculty of Arts and Science, Nigde University, Nigde, Turkey, myasar@nigde.edu.tr

Abstract

In this paper, we study on Padovan numbers and a type of upper Hessenberg matrix. We obtain a permanental relation between Padovan numbers and upper Hessenberg matrix $A_n$ defined as in the following

$$A_n = \begin{bmatrix}
1 & 2 & 1 & \cdots & \cdots & 0 \\
1 & 0 & 1 & 1 \\
1 & 0 & 1 & 1 \\
\vdots & \vdots & \vdots & \ddots & \cdots & \cdots \\
1 & 0 & 1 & 1 \\
0 & 1 & 0 & 1 & 0
\end{bmatrix}$$

Then we derive these numbers as determinants of upper Hessenberg matrix $A_n$.

Keywords: Padovan numbers, Hessenberg matrix, Permanent

General area of research: Mathematics
On the notion of linear sequential dynamic system involving parameter

Muhammet Candan

Department of Mathematics, Faculty of Arts and Science, Canakkale Onsekiz Mart University, Canakkale, Turkey, mcandan@comu.edu.tr

Abstract

This study concerns with discrete processes controlled by linear sequential dynamic system with arbitrary parameter. This paper is especially devoted to the determination of optimal control and corresponding trajectory in the considered system. Thus, necessary and sufficient condition theorems for optimality are proven as well.

Keywords: Linear sequential dynamic system, Optimal control, Trajectory

General area of research: Mathematics
Properties of U-decomposition in modules

Murat Alan¹ and Elif Ozbulur²

¹Department of Mathematics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, alan@yildiz.edu.tr
²Department of Mathematics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, elifozbulur@hotmail.com

Abstract

It is well known that an integral domain D is a Unique Factorization Domain (UFD) if and only if every nonzero non unit of D is a product of irreducibles, and this factorization into irreducibles is unique up to order and associates. This concept is generalized to commutative rings with zero divisors by several author. One of this generalization is given by using U-decomposition which is a special kind of factorization. To use U-decomposition in a factorization eliminates the bad behavior of factorization caused by non trivial idempotents. In this study we apply U-decomposition to unitary Modules. Let R be a commutative ring with identity and M be an unitary R-module. We investigate which factorization properties are valid when we transfer them from commutative ring R to unitary R-module M by using U-decomposition.

Keywords: Factorization, U-decomposition, Modules

General area of research: Mathematics
A note on iterative construction of irreducible polynomials over finite fields with characteristic 2

Murat Alan¹ and Betul Duman²

¹Department of Mathematics, Faculty of Arts and Science, Yıldız Technical University, Istanbul, Turkey, alan@yildiz.edu.tr
²Department of Mathematics, Faculty of Arts and Science, Yıldız Technical University, Istanbul, Turkey, betul.duman@outlook.com

Abstract

Factorization of polynomials over finite fields has great interest over the last decade because of its theoretical and practical importance. A lot of study is dedicated to determination of irreducible polynomials over finite fields. One of the main tool for construction a new irreducible polynomial from a given irreducible polynomial over a finite field is the composition method which is introduced by Cohen. Let \( f(x), g(x) \in F_q[x] \) and for any irreducible polynomial \( P(x) = c_0 + \cdots + c_n x^n \in F_q[x] \), where \( q \) is a prime power, the composition \( P(f/g) = g^n(x)P(f(x)/g(x)) = \sum_{i=0}^{n} c_i f^i(x)g^{n-i}(x) \in F_q[x] \) is irreducible over if and only if \( f(x) - \lambda g(x) \) is irreducible over \( F_{q^n} \) for some root \( \lambda \in F_{q^n} \) of \( P(x) \). In this talk, by using composition method, we give an iterative construction of irreducible polynomials over finite fields with characteristic 2 from given irreducible polynomials.

Keywords : Composition method, Irreducible polynomials

General area of research : Mathematics
Examination of SIRS mathematic model and stability analyse

YASIN UCAKAN

Yildiz Technical University, Istanbul, Turkey,
yasinucakan@hotmail.com

Abstract

Mathematic and numeric sciences contribute to modelling, defining; guessing, controlling and curing the behaviours of epidemic which people struggle for centuries.

In this presentation, primarily the basic form of SIRS epidemic model is considered and its stability analyse is examined. Later on, by extending this model, SIRS epidemic model’s global features which have different death rates features are discussed. Lyapunov Function Method and Criteria of Dulac are implemented as making analyses.

Keywords : Epidemic, Biomathematics, SIRS, Differential equation systems, Mathematical modelling

General area of research : Mathematics
The structure of one weight linear and cyclic codes over \( \mathbb{Z}_2 \times (\mathbb{Z}_2 + u\mathbb{Z}_2) \)

Ismail Aydogdu

Abstract

Linear codes over \( \mathbb{Z}_2 \times (\mathbb{Z}_2 + u\mathbb{Z}_2) \) have been introduced by Aydogdu et al. more recently. This family of codes, denoted by \( \mathbb{Z}_2\mathbb{Z}_2[u] \), are generalization of \( \mathbb{Z}_2\mathbb{Z}_4 \)–additive codes, actually. But compared to them, they have some advantages. A code is called constant weight(one weight) if all the codewords have the same weight. It is well known that constant weight or one weight codes have many important applications. In this paper, we study the structure of one weight \( \mathbb{Z}_2\mathbb{Z}_2[u] \)–linear and cyclic codes. We classify these type of one weight codes and also give some illustrative examples.

Keywords: One weight codes, \( \mathbb{Z}_2\mathbb{Z}_2[u] \)–linear codes, Cyclic codes, Duality

General area of research: Mathematics
A new application for solving large scale differential matrix Riccati equations

Yaprak Guldogan\textsuperscript{1}, Mustapha Hached\textsuperscript{2}, Muhammet Kurulay\textsuperscript{3}, and Khalid Jbilou\textsuperscript{4}

\textsuperscript{1}Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, guldogan@yildiz.edu.tr
\textsuperscript{2}Universite des Sciences et Technologies de Lille, Villeneuve d'Ascq, France, mustaphahached@gmail.com
\textsuperscript{3}Department of Mathematical Engineering, Yildiz Technical University, Istanbul, Turkey, mkurulay@yildiz.edu.tr
\textsuperscript{4}L.M.P.A, Universite du Littoral Cote d'Opale, France, jbilou@lmpa.univ-littoral.fr

Abstract

In this work we propose a new numeric method for the computation of approximate solutions to large–scale differential continuous-time matrix Riccati equations. These equations play an important role in control theory. The proposed method is based on Extended block Krylov subspace method. We project our problem onto an extended block Krylov subspace then we obtain a low dimensional differential Riccati equation that is solved by classical methods such as BDF or Rosenbrock. We give some theoretical results and present some numerical experiments to show the effectiveness of our method.

\textbf{Keywords} : Extended block Krylov, BDF, Rosenbrock low rank, Riccati equations

\textbf{General area of research} : Mathematics
A hybridizable discontinuous Galerkin method for the steady state fractional advection–dispersion equation

Mehmet Fatih Karaaslan\textsuperscript{1} and Muhammet Kurulay\textsuperscript{2}

\textsuperscript{1}Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, mfatih@yildiz.edu.tr
\textsuperscript{2}Department of Mathematical Engineering, Yildiz Technical University, Istanbul, Turkey, mkurulay@yildiz.edu.tr

Abstract

In this study, a hybridizable discontinuous Galerkin (HDG) method is used for solving the steady state fractional advection dispersion equation (FADE). This equation is seen in groundwater hydrology to model the transport of passive tracers carried by fluid flow in a porous medium. It is possible to find a superconvergence for the ordinary and partial differential equations by using the HDG method. So, we apply the HDG method on a class of FADEs for obtaining an approximate solution. The stability parameter is a very effective tool to get convergent results.

Keywords: Hybridizable discontinuous Galerkin method, Fractional advection dispersion equation, Stability parameter

General area of research: Mathematics
On stable difference schemes for multipoint NBVP of the hyperbolic type

Ozgur Yildirim and Meltem Uzun

1 Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, ozgury@yildiz.edu.tr
2 Department of Mathematics, Yildiz Technical University, Istanbul, Turkey, meltemu@yildiz.edu.tr

Abstract

This study presents high order of accuracy stable difference schemes for multipoint nonlocal boundary value problems for hyperbolic equations. The stability estimates for the approximate solution of these difference schemes are presented. Some numerical experiments verifying theoretical statements are considered. In these experiments errors and CPU times are computed and presented in tables.

Keywords : Nonlocal and multipoint boundary value problems, Stability

General area of research : Mathematics
Mueller matrix study of the non uniform liquid crystal cell

Omer Polat

Faculty of Engineering, Bahcesehir University, Istanbul, Turkey, omer.polat@eng.bau.edu.tr

Abstract

Liquid crystals (LC) are birefringent materials in which polarization properties of the light can be changed and controlled by external effects i.e., temperature, applied electric and magnetic fields...etc. Because of the different factors, such as coherency of the incoming light, non-uniformity of the media, light scattering...etc., transmitted light depolarizes when it pass through the LC cell. In this case, measuring the degree of polarization becomes essential as it plays an important role on the performance of the LC based devices. Theoretically, depolarization of the light can be investigated by means of the Mueller–Stokes calculus. Using this technique, one can calculate the degree of polarization of the light passing through the LC cell, multiplying the Mueller Matrix (MM) of the cell by Stokes vector of the incoming light.

In this work, we investigated the effect of the birefringence non-uniformity on the MM elements of the LC cell. We assumed that retardance of the LC cell changes from one local area to another. Plots of the MM elements of the cell versus wavelength showed that sinusoidal curves of the elements which differ from the curves of the uniform cell have damped oscillating amplitudes. Besides, degree of polarization of the exiting light as well as the behavior of the MM curves changes as the birefringence non uniformity is changed. Obtained results are in good agreement with the recent experimental study in which damped oscillating MM curves was observed for the LC cell illuminated with different beam spot size.

Keywords : Muller matrix, Liquid crystals, Light depolarization
General area of research : Physics
Spin $1/2$ particles in $(2 + 1)$ dimensions coupled to gravity

Hasan Tuncay Ozcelik$^1$ and Reyhan Kaya$^2$

$^1$Department of Physics, Yildiz Technical University, 34220, Davutpasa, Istanbul, Turkey, tuncay_ozcelik@yahoo.com
$^2$Department of Physics, Yildiz Technical University, 34220, Davutpasa, Istanbul, Turkey, rkaya@yildiz.edu.tr

Abstract

We couple spin $1/2$ particles in $(2 + 1)$ dimensions to Einstein–Cartan gravity. General relativity in $(2 + 1)$ dimensions has become an increasingly popular in which to understand basic features of the gravitational dynamics. We introduce notation and definitions used throughout this work. We set up the total action function of spin $1/2$ particles with gravitation. We calculate the variation of the action with respect to metric and contortion. We give explicit form of the Dirac equation and Einstein–Cartan field equations. These equations can not be solved analytically. By using the methods of 4th order Runge–Kutta we give the numerical solutions.

Keywords: Spin $1/2$ particles, Einstein–Cartan theory, Torsion, Contortion

General area of research: Physics
In-situ evaluation of shear strength of soft clay from shear wave velocity and damping measurements

Khairul Anuar Mohd. Nayan¹, Bukhari Ramli², Anuar Kasa³, Colin Peter Abbiss⁴, Mohd Nor Omar⁵, and Kowstubaa N. Ramalingam⁶

¹Department of Civil and Structural Engineering, Universiti Kebangsaan Malaysia, Bangi, Malaysia, kamn56@ukm.edu.my
²Department of Civil and Structural Engineering, Universiti Kebangsaan Malaysia, Bangi, Malaysia, bramli99@gmail.com
³Department of Civil and Structural Engineering, Universiti Kebangsaan Malaysia, Bangi, Malaysia, anuar@ukm.edu.my
⁴Former Building Research Establishment, United Kingdom, jancol.abbiss@gmail.com
⁵Geotechnical Engineering Division, Public Works Department of Malaysia, mnor57@gmail.com
⁶Department of Civil and Structural Engineering, Universiti Kebangsaan Malaysia, Bangi, Malaysia, kowstubaa@gmail.com

Abstract

Conventional geotechnical methods of determining shear strength of clay involving soil parameters collected from laboratory and in-situ test are quite established. A seismic method based on shear wave velocity and damping is hereby proposed in order to reduce problems related to stress relief, sample disturbances and localized nature of samples that are well known and to produce errors in the conventional tests. In this study, an equation based on the hyperbolic shear stress-strain model proposed by Hardin and Drnevich is presented. This shear stress-strain relationship follows a backbone curve where the characteristic strain in this equation was obtained from the damping-strain relationship of Abbiss. The input to the proposed equation is the shear wave velocity and the characteristic strain calculated from damping at a known strain level of the Plate Load Test. The proposed equation is shown to produce shear stress-strain relationships able to be plotted to failure.
where the maximum shear strength can be inferred from the anticipated failure strain level of 4%. The proposed equation was applied using the reference strain data of the Plate Load Test. Better agreement was obtained from the results of the proposed equation in comparison to the average Geonor Vane result although they overestimated shear strength values by a difference of 32 and 1.3% at depth of 2 and 5 m respectively. The conventional geotechnical laboratory and in-situ Acker Vane tests overestimated the shear strength values between 2.5 to 80.4%.

**Keywords**: Hyperbolic, Shear wave velocity, Damping, Clay, Shear strength

**General area of research**: Physics, Engineering
Modified TiO$_2$ embedded nanofibrous composites for lead removal

M. Fatih Canbolat$^1$, Sitki Baytak$^2$, and Abdul Majid Channa$^3$

$^1$Department of Textile Engineering, Faculty of Engineering, Suleyman Demirel University, Isparta, 32260, Turkey, fatihcanbolat@sdu.edu.tr

$^2$Department of Chemical Engineering, Faculty of Engineering, Suleyman Demirel University, Isparta, 32260, Turkey, sitkibaytak@sdu.edu.tr

$^3$Suleyman Demirel University, Isparta, 32260, Turkey, channa_abdulmajid@yahoo.com

Abstract

One of the most pervasive problems afflicting people throughout the world is inadequate access to clean water and sanitation (Sánchez-Avila et al. 2009). In this manner, presence of toxic contaminants in environmental water samples is an important subject which has attracted attention of many researchers and became a popular study title around the world due to direct threatening role on viability and ecological life. Heavy metals, especially lead in aquatic system may cause serious health hazardous to the living creature and surroundings (Groffman et al. 1992). In this study, it is proposed developing an easy and efficient method for the preparation of a novel polyvinyl pyrrolidone titanium oxide (PVPT) sandwiched PCL nanofibrous composite layers by electrospinning method for the treatment of lead contaminated water. Electrospinning is a multipurpose, cost-effective way of spinning that provides rapid formation of nanofibers with functional properties (Teo and Ramakrishna, 2006). In order to characterize the produced structures and analyse the adsorption performance, SEM, FTIR and ICP-AES analysis were conducted. According to SEM micrographs, average fiber diameter for pure PVP was calculated as 143±35 nm while it was found 114±31 nm for PVPT. In both cases, uniform fibers with smooth surfaces were obtained. Produced composite structures exhibited promising uptake efficiency of lead from the water system. Optimum removal was achieved at pH 8 with 30 min agitation time by taking initial concentration of lead solution as 10 mg L$^{-1}$ and adsorbent dosage as 50 mg. The kinetics of adsorption was well described by
second order kinetic model with the correlation coefficient 0.99. Monolayer adsorption capacity of PVPT was calculated as 33.33 mg g$^{-1}$.

**Keywords**: Nanofiber, Electrospinning, Lead removal, Modified TiO$_2$, Heavy metals

**General area of research**: Physics
The humidity sensing properties of Al-Cd nanoparticle was investigated. The humidity sensitive nanoparticle was prepared by co-precipitation method. The humidity sensing properties of the sample was tested by impedance measurements by varying the relative humidity from 15 to 95%. The working frequency is a key parameter for resistant humidity sensors. In order to determine the optimal working frequency, the impedances modules of the sensor under different frequencies were measured. According to the investigation, samples impedance decreases sharply. The sensor has an acceptable sensitivity, quick response and recovery time, good repeatability, a narrow hysteresis and good long term stability. Also its dependence of complex impedance spectra, measured on the relative humidity, operating temperature and on the measuring frequency is shown and explained. This experimental results show that Al-Cd nanoparticle has a great potential for humidity sensing applications in room temperature operations.

Keywords : Nanoparticles, Humidity, Impedance

General area of research : Physics
Total cross section of ions

GURAL AYDIN

Faculty of Arts and Science, Mustafa Kemal University, Hatay, Turkey, guralaydin@gmail.com

Abstract

The data for the total production cross section of molecules and atoms with light and medium weight needs to be improved on nuclear data table. The future experiments could decrease the gap for cross section data and help the development of simulation programs for the total cross section calculation of ions. In this study, the aim is to compare a latest experiment results of total ion cross section with the results obtained with Geant4 simulation program. Also, the comparison will be evaluated taking account of different physics lists in the simulation program.

Keywords: Total cross section, Ions, Geant4

General area of research: Physics
Gross alpha and gross beta activity concentration in sediments in Gulf of Izmir (Eastern Aegean Sea, Turkey)

Erol Kam1, Zeki U. Yumun2, and Dilek Kurt3

1 Department of Physics, Faculty of Arts and Sciences, Yildiz Technical University, Davutpaşa Campus, 34220, Esenler, Istanbul, Turkey, erolkam@yildiz.edu.tr
2 Department of Environmental Engineering, Faculty of Corlu Engineering, Namik Kemal University, 59860, Corlu, Tekirdag, Turkey, zyumun@nku.edu.tr
3 Department of Physics, Faculty of Arts and Sciences, Yildiz Technical University, Davutpaşa Campus, 34220, Esenler, Istanbul, Turkey

Abstract

The concentration of gross alpha and gross beta radioactivity were analyzed in current sediments of the Gulf of Izmir (Eastern Aegean Sea). The sediments were collected from four different locations where are very wealthy in terms of industry on the coast of the Gulf of Izmir. Each processed sample was determined for gross alpha and gross beta radioactivity by using a low-background counter (Berthold, LB 770 10-channel α−β low-level counter). The obtained results show that natural gross alpha and gross beta activity concentrations in the drilling cores range from 0.49 ± 0.05 to 1.60 ± 0.10 Bq kg⁻¹ and 3.02 ± 0.15 to 5.20 ± 0.19 Bq kg⁻¹, respectively. These results were compared with previous studies throughout the world, and the study could be a reference data for the future research related to radiological mapping or environmental monitoring in the area.

Keywords: Gulf of Izmir, Gross alpha, Gross beta, Sediment

General area of research: Physics
Dynamic mechanical analysis of PP/PET blends and artificial neural network modelling

Fatma Kosavali Cavus¹, Yesim Ozcanlı², Murat Beken³, Elif Tekin Tarım⁴, and Erdem Coban⁵

¹Department of Electronics Technologies, Halic University, Istanbul, Turkey, fatmacavus@halic.edu.tr
²Department of Physics, Yıldız Technical University, Istanbul, Turkey, lenger@yildiz.edu.tr
³Department of Applied Mathematics, Halic University, Istanbul, Turkey, muratbeken@gmail.com
⁴Department of Mathematics, Yıldız Technical University, Istanbul, Turkey, tekintar@yildiz.edu.tr
⁵Department of Construction Technologies, Halic University, Istanbul, Turkey, erdemcoban@halic.edu.tr

Abstract

In recent years, artificial neural networks (ANN) that was introduced in the many areas has become a powerful tool for solving non-linear therefore it started to be applied in many different areas of materials research. In this study, dynamic mechanical properties of polypropylene/polyethylene terephthalate (PP/PET) polymer blends were investigated and ANN modeling of experimental results were reviewed. In the results of dynamic mechanical analysis (DMA), glass transition temperature increases with increasing frequency and an increase in the intensity of the peaks was observed. Storage modulus did not show a significant change between the rate of 0–20% PET but the storage modulus exhibited a higher increase between rate of 20–40% PET. Storage modulus showed a serious decline at PP+50% PET blends. The ANN technique with a feed-forward back propagation algorithm was used to examine glass transition temperature and storage modulus values of PP/PET blends. PET rate and temperature are used as inputs and storage modulus, tan delta, glass transition temperature are used as outputs for ANN modelling. ANN results and the experimental results were compared.
and the results were observed with sufficient accuracy.

**Keywords**: Polymers, Dynamical mechanical properties, Artificial neural network

**General area of research**: Physics
Abstract

This study investigates the foraminiferal genera and species which live around Kapidag Peninsula, Avsa Island and Marmara Island located in the south of the Marmara Sea and unaffected by the environment pollution. Within this context, a total of 19 surface sediment samples (11 from Kapidag Peninsula, 4 from Avsa Island and 4 from Marmara Island) and water samples were collected. Granulometric analysis, heavy metal and radioactivity analysis of the sediment samples were carried out. In addition, foraminiferal genera and species were identified. No color and morphological changes have been observed in the foraminifera of 12 different genera represented by 30 identified species. They are in a good state in terms of numerical abundance. Some studies were carried out in order to determine any morphological variations. Taxonomic identifications of benthic foraminifera were made and SEM (Scanning Electron Microscope) photographs of them were taken. In the next step, physical sizes of 10 individuals from each foraminiferal species were measured and their size analyses were performed. The obtained data were statistically evaluated and mean values were calculated. In addition to this, the results of the heavy metal (Fe, Zn, Al, Mn, Ag, As, B, Bi, Cd, Co, Cr, Cu, Mo, Ni, Pb, Pt, Sb, Sn, Se, Hg, Na, Mg, K, Ca and P) and radioactivity analysis were calculated as mean values. The mean values calculated
in this study can be referred to as indicative values in future studies which will be conducted in the Marmara Sea.

Keywords: Foraminifer, Kapidag Peninsula, Avsa Island, Marmara Island, Heavy metal, Radioactivity

General area of research: Physics
ICFAS2016

Chemistry
Dielectric breakdown strength of polymer-particle nanocomposites

Ahmet Lutfi Ugur, Thomas Schuman, and Fatih Dogan

Materials Science and Engineering Department, Canakkale Onsekiz Mart University, Canakkale, Turkey, alugur@comu.edu.tr

Abstract

Polymers are widely used as insulation material in high voltage systems due to their high breakdown strength under electrical stress. Researchers in the last decade have developed a new material, polymer nanocomposite (also known as nanofiller-added polymers), which may replace conventional polymer composites with enhanced properties [T. P. Schuman, S. Siddabattuni, O, Cox, F. Dogan, Compos. Interf. 17(8) (2010) 719–731].

Polymer nanocomposites properties may have a further impact on the behavior of insulation in electrical systems. We may expect improvements in electrical properties such as higher breakdown strength, higher resistance to partial discharges, and treeing, as well as in their mechanical and chemical properties.

The interface between the polymer and the particle has a critical role in altering the properties of a composite dielectric. Polymer-ceramic nanocomposites are promising dielectric materials for many electronic and power devices, combining the high dielectric constant of ceramic particles with the high dielectric breakdown strength of a polymer. Self-assembled monolayers of electron rich or electron poor organophosphate or organophosphonate coupling groups were applied to affect the filler–polymer interface and investigate the role of this interface on composite behavior. The composite films synthesized from the modified filler particles dispersed into a polycarbonate polymer matrix were analyzed by breakdown strength measurements.

*This study was supported by TUBITAK (The Scientific and Technical Research Council of Turkey), under the project number TUBITAK–1059B191400439.
The data indicate that significant improvement in dielectric breakdown strengths resulted.

**Keywords**: Dielectric breakdown strength, Polymer–particle nanocomposite

**General area of research**: Chemistry
ID–ICFAS2016: 1102

Synthesis and characterization of polycaprolactone/montmorillonite composite scaffold containing zinc for bone tissue engineering applications*

Aysel Koc Demir

Tissue Engineering, Biomaterials and Nanobiotechnology Laboratory, Ankara University Faculty of Science, Ankara, Turkey, akocaysel@yahoo.com

Abstract

Tissue engineering (TE) and regenerative medicine aim to restore diseased or damaged tissue using combinations of functional cells and biodegradable scaffolds made from engineered biomaterials [L. L. Hench, J. M. Polak, Science 295 (2002) 1014–1017 and D. Williams, Mater. Today 7 (2004) 24–29]. In recent years, biomaterials have been incorporated with zinc to supply increase of the osteoblasts activity. It is necessary for bone growth, development and able to function in a healthy manner. From this point, the release of zinc from composite materials is very important to support of bone regeneration. Montmorillonite (MMT) may be considered as ‘an ion reserve’ due to its properties such as high surface area, swelling capacity, cation exchange capacity. In this study, the polycaprolactone/montmorillonite (PCL-MMT) composite scaffolds were produced with improved osteogenic properties to be used in bone tissue engineering applications. Zn\(^{2+}\) modified PCL-MMT composite scaffolds with an interconnected porous structure were produced by particulate leaching method. The macrostructure and morphology of the prepared composite scaffolds were investigated using X-ray diffraction (XRD), fourier transform infrared spectroscopy (FT-IR), thermal gravimetric analysis (TGA) and scanning electron microscopy (SEM). The released amounts of Zn\(^{2+}\) from the non-modified and modified scaffolds into cell culture medium were determined by Inductively Coupled Plasma (ICP). The biocompatibility of the composite was evaluated by cell culture experiments. Adipose derived mesenchymal stem cells were cultured, expanded and seeded

*This study was supported by TUBITAK (The Scientific and Technical Research Council of Turkey), under the project number TUBITAK1002 (214M017).
on Zn$^{2+}$ modified and non-modified PCL-MMT scaffolds. In vitro cell viability and proliferation were investigated using Alamar blue analysis, while cell-scaffold constructs were evaluated with SEM. In vitro studies confirm that PCL-MMT scaffolds are biocompatible and have no negative effects on the cells. Ions present in the MMT were released into cell culture media which led to the induction of osteoblast activity in PCL-MMT scaffold system. The obtained results showed that the prepared composite scaffold as a prospective candidate for bone tissue engineering.

**Keywords**: Bone tissue engineering, Montmorillonite, Polycaprolactone, Zinc

**General area of research**: Chemistry
Abstract

Bromoquinolines have been of interest for chemists as precursors for heterocyclic compounds with multifunctionality. These building blocks have especially been used within medicinal chemistry as starting materials for numerous compounds with pharmacological activity. Several different strategies for the preparation of substituted quinolines are known. Most synthetic routes leading to these cyclic structures consist of cyclization reactions starting from benzene (or cyclohexane) derivatives substituted with nitrogen functions. Such reactions include the Skraup, Friedlander, Doebner-von Millet, and Combes syntheses.

Recently, we explored that bromination reaction of 1,2,3,4-tetrahydroquinolines are good starting points both ring for functionality [I. Celik, M. Akkurt, S. Okten, O. Cakmak S. Garcia-Granda, Act Crys. E66 (2010) 03133; S. Okten, O. Cakmak. R. Erenler, O. Yuce, S. Tekin, Turkish J. Chem. 37(6) (2013) 896-908; S. Okten, O. Cakmak, Tetrahedron Lett. 56(39) (2015) 5337-5340]. We now describe four convenient approaches and strategies towards the synthesis of polysubstituted quinolines. The main idea of these works are to explore the new strategies for the synthesis of polysubstituted quinoline, starting from 5/6/7/8-substituted 1,2,3,4-tetrahydroquinolines, which provides the efficient synthesis of C-3 bromoderivatives. The reactivity difference of bromine atoms on the heterocyclic ring facilitates the consecutive substitution, leading to the series of poly substituted analogues. The experimental methods are simple, require cheap starting materials, promise large scale synthesis with high yields and involve easy isolation of the final products.

*This study was supported by TUBITAK (The Scientific and Technical Research Council of Turkey), under the project number TUBITAK - 112T394.
We describe four methodologies for the synthesis of novel poly substituted quinoline derivatives: (1) 1,2,3,4-tetrahydroquinoline (THQ) was brominated to furnish 6-bromotetrahydroquinoline and 6,8-dibromotetrahydroquinoline followed by their aromatization to give bromo quinoline analogues. In addition these, 6,8-diBrTHQ was furter brominated to 3,6,8-tribromoquinoline (3,6,8-triBrQ). Also 3,6-diBrQ was prepared by Eisch bromination method. (2) The brominated tetrahydroquinolines were transformed to their respective -OMe, -CN and -Ph derivatives via copper induced methoxilation, cyanization and Suzuki coupling reactions. Their bromination at C-3 position accompanied by aromatization afforded corresponding quinoline derivatives. (3) The bromo and methoxy quinolines were converted to nitro derivatives. (4) Bromination of donor substituted (-OH/-OMe/-NH2) quinolines provide specific and selective results in poly functionalization of quinoline nucleus.

**Keywords**: Quinoline, Bromoquinoline, Quinoline derivatives, 1, 2, 3, 4- Tetrahydroquinoline derivatives, Polyfunctionalization of quinoline, New methodologies for quinolines

**General area of research**: Chemistry
Investigation of the acid-catalyzed hydrolysis and reaction mechanism of N-(4-substitutedaryl) phthalimides

Hasan Yakan1, Elvan Tolgay2, and Halil Kutuk3

1 Department of Chemistry, Faculty of Education, Ondokuz Mayis University, Samsun, 55139, Turkey, hasany@omu.edu.tr
2 Department of Chemistry, Faculty of Arts and Sciences, Ondokuz Mayis University, Samsun, 55139, Turkey, tanertolgay@hotmail.com
3 Department of Chemistry, Faculty of Arts and Sciences, Ondokuz Mayis University, Samsun, 55139, Turkey, hkutuk@omu.edu.tr

Abstract

In this study N-(phenyl)phthalimide, N-(4-methylphenyl)phthalimide and N-(4-chlorophenyl)phthalimide were synthesised and their stock solutions were prepared in acetonitrile for kinetic studies [J. Klose, C. B. Reese, Q. Song, Preparation of 2-(2-cyanoethyl)sulfanyl-1H - isoindole-1,3-(2H)-dione and related sulfur-transfer agents, Tetrahedron 53(42) (1997) 14411–14416]. The acid catalysed hydrolysis of the compounds synthesised were studied in solutions of sulfuric acid, perchloric acid and hydrochloric acid at 50.0±0.1°C.

and substituent effect [R. A. Y. Jones, Physical and Mechanistic Organic Chemistry. Cambridge University Press, Cambridge, 1–426, 1984] are consisted with an A-2 mechanism in the whole range of acidity. Catalytic order of strong acids for the acid catalysed hydrolysis of the compounds studied were as H2SO4>HCl>HClO4 in the whole range of acidity. This is the characteristics of an A–2 mechanism [C. A. Bunton, J. H. Fendler, The hydrolysis of carboxylic anhydrides. VII.1,2 electrolyte effects on the acid hydrolysis, J. Org. Chem. 31 (1966) 3764–3771].

**Keywords**: Arylpthalimides, Excess acidity, Activation entropy, Acid-Catalyzed hydrolysis

**General area of research**: Chemistry
Photodegradation of organic pollutants by using novel heterogeneous photocatalysis

Yusuf Yilmaz, Aysun Korkmaz, and Mehmet Kahraman

Abstract

Organic pollutants that causing environmental pollution have been well documented. In recent years there are lots of investigations related to degradation of the organic pollutants via oxidants by photocatalysts such as metallophthalocyanines. Phthalocyanines have been used as both homogeneous and heterogeneous photocatalysts due to their some important abilities such as absorption in the visible region and singlet oxygen generation.

In this work we prepared a novel heterogeneous photocatalysis that phthalocyanine based and contains nanometal (Au&Ag) coated silica microparticles as solid support. The photocatalytic performances of the novel prepared photocatalyst (SiO2@Au/Ag-Pc) was tested first with batch method to select the high performance photocatalyst (SiO2@Au-Pc or SiO2@Ag-Pc) against to organic pollutants such as orange G, methyl orange and 4-chlorophenol. The selected high performance heterogeneous photocatalyst (SiO2@Au-Pc) was charged to a chromatography column and this column was integrated into the photocatalytic set up which has a quartz lamp (300 W, 60 V) and a peristaltic pump to adjust the flow rate of prepared wastewater. Photodegradation of organic pollutants (Orange G, methyl orange and 4-chlorophenol) was observed by this photocatalytic set up. The photodegradation of used organic pollutants was obtained 64.36% for orange G, 41.97% for methyl orange and 7.80% for 4-chlorophenol at the end of the fourth cycle.
with the following set up.

Keywords: Organic pollutants, Photocatalysts, Phthalocyanines, Heterogeneous catalysis

General area of research: Chemistry
Temperature effect on some surface properties of polysorbates and cetyl trimethyl ammonium bromide mixed systems

Taliha Sidim 1, Meltem Arda2, and Merve Cakmak3

1Department of Chemistry, Faculty of Science, Trakya University, Edirne, Turkey, t_sidim@yahoo.com
2Department of Chemistry, Faculty of Science, Trakya University, Edirne, Turkey, mltm13@gmail.com
3Department of Chemistry, Faculty of Science, Trakya University, Edirne, Turkey

Abstract

The interfacial and thermodynamic properties of nonionic surfactants and their mixtures are of both theoretical and practical interest. The nonionic surfactants used in this study are polysorbate nonionics, i.e. polyoxyethylene (20) sorbitan monolaurate, monopalmitate, and monostearate, sold as Tween 20, 40, 60 and abbreviated PS 20, 40, 60 respectively. The critical micelle concentration (CMC) of aqueous solutions of the individual surfactants cetyl trimethyl ammonium bromide (CTAB) and polysorbate nonionics, and their mixtures are determined at different proportions and temperatures. The cmc values of single and mixed surfactants were determined by conductivity and surface tension measurements and were analysed in terms of Clint’s equation and Rubingh’s model.

Keywords: Surface tension, Conductivity, Critical micelle concentration, Temperature effect, Nonionic surfactant

General area of research: Chemistry
Exogenously benzoic acid shows protective antioxidant roles in wheat leaves at cold stress

**Barbaros Nalbantoglu**¹, Huseyin Kanbur¹, and Salih Mutlu²

¹Department of Chemistry, Science and Art Faculty, Yildiz Technical University, Istanbul, Turkey, barbaros@yildiz.edu.tr

²Department of Biology, Science and Art Faculty, Erzincan University, Erzincan, Turkey, salihmutlu@yahoo.com

**Abstract**

This study was performed in order to show to the understanding of possible role of mechanism of benzoic acid (BA) on alleviating cold damage in leaves having different cold tolerance. For this aim, cold–tolerant (Bezostaya, Odeska and Y-100) and cold–sensitive (Cumhuriyet 75, Cemre and Pandas) cultivars of six wheat (*Triticum aestivum* L.) were used. Exogenously BA (0.01 and 0.03 mM) was applied to 10–day old wheat seedlings growing under control condition (20/18°C) and then the seedlings were transferred to cold condition (−1/−5°C) at 11–day for 3 days. Using the leaves (control, cold control and cold+BA) of seedlings harvested at 14–day old, the levels of H$_2$O$_2$, O$_2$.−, of CAT, APX, GR, SOD and POD activities, of phenolic and carotenoid contents were determined. Cold treatment, in all the cultivars, generally increased the levels of H$_2$O$_2$, O$_2$.−, of CAT, APX, GR, SOD and POD activities while generally decreased the content of carotenoid. Cold+BA treatment, in all the cultivars, generally decreased the levels of H$_2$O$_2$, O$_2$.− while generally increased the activities of CAT, APX, GR and POD, the contents of phenolic and carotenoid. In the light of the results, it can be seen that exogenous BA treatment can play protective antioxidant roles on alleviating cold damage in wheat. It can be concluded that the obtained results may contribute to research related to diminishing cold damage in agricultural applications in the future.

**Keywords**: Benzoic acid, Cold, *Triticum aestivum*, Reactive oxygen species, Antioxidant enzymes, Phenolic, Carotenoid

**General area of research**: Chemistry
Ag doped TiO$_2$ nanoparticles prepared by hydrothermal method and coating of the nanoparticles on the ceramic pellets for photocatalytic study: Surface properties and photoactivity

Oguzhan Avciata$^1$, Yildiz Benli$^2$, and Semih Gorduk$^3$

$^1$Department of Metallurgical and Materials Engineering, Faculty of Chemistry and Metallurgical, Yildiz Technical University, Esenler, 34210, Istanbul, Turkey, avciata@yahoo.com

$^2$Department of Chemistry, Faculty of Arts and Sciences, Yildiz Technical University, 34210, Esenler, Istanbul, Turkey, y.karaer@hotmail.com

$^3$Department of Chemistry, Faculty of Arts and Sciences, Yildiz Technical University, 34210, Esenler, Istanbul, Turkey, semih_grdk@hotmail.com

Abstract

TiO$_2$ is the most effective because of its high photosensitivity, chemical stability, low cost, easy availability and environmental friendly. However, a major disadvantage of TiO$_2$ is the large band gap of 3.2 eV which limits its activity. To overcome these restrictions of TiO$_2$, many studies have been perform to enhance the electron–hole separation and to extend the absorption range of TiO$_2$ into the visible region and UV region. These studies included deposition of noble metals onto the TiO$_2$ surface [C. A. Martinez–Huitle, E. Brillas, Applied Catalysis B: Environmental, 87 (2009) 105–145], [H. Y. Chuang, D.–H. Chen, Nanotechnology 20 (2009) 105704]. Among the metallic species which can be incorporated onto TiO$_2$ surface, Ag has shown an enhanced electron-hole separation and interfacial charge transfer ability, as well as the increase of the visible light and UV light excitation of TiO$_2$ [I. H. Chowdhury, S. Ghosh, M. K. Naskar, Ceramics International 42 (2016) 2488–2496].

In this work, Ag doped nano TiO$_2$ photocatalysts were synthesized in powder form by hydrothermal method at 180$^\circ$C in 120 min. using different reduction agents. The synthesized powders were characterized by powder XRD, EDS, BET, TEM and SEM analyses. The effect of reduction agents on the morphological properties of Ag doped nano TiO$_2$ has been studied.
We have been observed that the use of different reduction agents affects the particle size and surface area. Ag doped nano TiO$_2$ photocatalysts were coated to the ceramic pellets by dip coating technique for photocatalytic study. Photocatalytic properties of the synthesized powder were examined with indigo blue (IB) solution under UV irradiation. Periodical UV spectrophotometric analysis showed that indigo blue (IB) has been degraded and its concentration has decreased under UV irradiation by time.

**Keywords**: Ag doped, Nano TiO$_2$, Hydrothermal process

**General area of research**: Chemistry, Materials
Abstract

Zinc oxide (ZnO) is one of the most important multifunctional semiconductor with its wide band gap (3.37 ev) and its large exciton binding energy (60 meV). In recent years, ZnO nanostructures have attracted considerable interest in the field of engineering, material science because of their wide range of potential applications in electronic, optoelectronic and biomedical devices. Its structural, optical and electrical properties can be improved by using appropriate doping materials. Transition metal-doping of ZnO nanostructures has proven to induce new electrical and optical properties in the host semiconductor. Cu-dopant has significant effects on the electrical, chemical and optical properties of ZnO nanostructures. Sonochemical method has been recently investigated as a promising alternative technique for the synthesis of nanostructures with uniform size and shape because of its fast, simple, convenient, economical, and environmentally advantages. In this study, Cu-doped ZnO nanostructures were successfully synthesized with sonochemical method by using different zinc salts. The particle size and morphology of the nanostructures at different precursor concentration and sonochemical time were experimentally investigated. The obtained Cu-doped ZnO nanostructures were characterized by X-ray diffraction (XRD), energy dispersive X-ray spectroscopy (EDX) and transmission electron microscopy (TEM) methods.

Keywords: Cu-doped ZnO, Sonochemical synthesis, Nanostructure, Characterization

General area of research: Chemistry

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ID–ICFAS2016: 1237

The effects of taurine on aminolevulinic acid dehydratase activity in nonylphenol-induced toxicity

YASEMIN SUNUCU KARAFAKIOGLU1, IBRAHIM HAKKI CIGERCİ2, AND FATIH FİDAN3

1Department of Science Education, Faculty of Education, University of Usak, 64200, Usak, Turkey, yasemin.sunucu@usak.edu.tr
2Department of Biology, Faculty of Science and Literature, Afyon Kocatepe University, 03200, Afyonkarahisar, Turkey, cigerci@aku.edu.tr
3Department of Biochemistry, Faculty of Veterinary Medicine, Afyon Kocatepe University, 03200, Afyonkarahisar, Turkey, ffidan@aku.edu.tr

Abstract

The aim of this study was to investigate the effects of taurine on blood amino levuninic acid dehydratase (ALAD) activity in nonylphenol-induced rats. Forty rats were divided into 5 groups each containing 8 Wistar-albino male rats: Control group (C) by standart rat feed, nonylphenol group (NP) by standart rat feed + 50 µg kg-1 diet nonylphenol, taurine group (T) by sandart rat feed+3% taurine (v/w) in drinking water, nonylphenol + taurine group (NPT) by standart rat feed+ 50 µg kg-1 diet nonylphenol+3%taurine (v/w) in drinking water and alcohol group (A) by standart rat feed +50 µg kg-1 diet alcohol were fed ad libitum for 30 days during the study. The blood ALAD activity significantly increased in T group compared the other experimental groups. Nonylphenol treatment significantly decreased the blood ALAD activity as compared to control. Decreased levels of blood ALAD activity in NP group were significantly increased in NPT group. The ALAD activity significantly decreased in A group compared the T group. The results demonstrate that taurine could provide great advantages against to side effects of nonylphenol toxication on ALAD activity in rats those exposed to Nonylphenol.

Keywords : Nonylphenol, Taurine, ALAD activity, Toxicity

General area of research : Chemistry
Investigation the photophysical and photochemical properties of phthalocyanines

ALI ERDOGMUS

Department of Chemistry, Faculty of Science and Art, Yildiz Technical University, 34210, Istanbul, Turkey, erdogmusali@hotmail.com

Abstract

Phthalocyanines (Pcs) have attracted a great deal of research interests in the fields of research and industrial application for many years, because of their intense coloration and extraordinary redox behavior associated with 18π-electron system of the phthalocyanine core, peripheral and nonperipheral substituents, and central metal cations. Thus, phthalocyanines are widely studied in the fields of solar cell, LED, electrocatalyst, electrochromic devices, and photosensitisers for photocataytic applications such as Photodynamic Therapy (PDT), due to their diverse electronic, optical, structural, and coordination properties. Their versatile application fields can be tuned by changing central metal cations and substituents. A Phthalocyanine molecule consists of a central cavity that can accommodate around seventy different metal ions. Introduction of metal cations into the central cavity of phthalocyanine molecules influences its chemical and physical properties greatly. Moreover, the ability of binding various substituents to the peripheral and nonperipheral positions of the phthalocyanine ring changes the properties of the complexes considerably in pursuant of scope. The studies indicate that for PDT applications. It is important that MPcs exhibit high absorption coefficients ($\varepsilon > 10^5$M$^{-1}$ cm$^{-1}$) in the visible region of the spectrum, mainly in the phototherapeutic window (600–800 nm) and a long lifetime of triplet excited state to produce efficiently singlet molecular oxygen, $O_2$(1$\Delta$g) [A. Erdogmus, T. Nyokong, Dyes and Pigments 86 (2010) 174–181].

In this study, synthesis, photophysical and photochemical properties of some phthalocyanines compounds were summarized.

Keywords : Phthalocyanines, Photophysic, Photochemistry

General area of research : Chemistry
Abstract

Cyclophosphazenes \([\{N = PR_2\}_n]\) \((n = 3, 4, 5, \ldots)\), are inorganic ring systems in linear, cyclic and polymeric forms composed of a backbone that contains the repeating unit with trivalent nitrogen and pentavalent phosphorus atoms and one or two organic, inorganic and organometallic side groups \((R)\), covalently linked to each phosphorus atom. The chlorocyclophosphazenes, \(N_3P_3Cl_6\) and \(N_4P_4Cl_8\), are the best-known members of chlorocyclophosphazenes. A large number of \(N_3P_3Cl_6\) and \(N_4P_4Cl_8\) derivatives have been obtained with mono- and difunctional ligands.

In this study, the \(Cl\) replacement reaction of \(N_4P_4Cl_8\) (1), with one equimolar amount of sodium salt of NO donor-type bidentate ligand containing mono-ferrocenyl pendant arm (2) afforded two kinds of derivatives, namely, mono-ferrocenyl-2-cis-4-dichloro-ansa- (2,4-ansa; 3) and mono-ferrocenyl-spiro- (spiro; 4) hexachlorocyclophetra phosphazenes. The partly substituted 2,4-ansa (3) and spiro (4) were reacted with excess diols, 2,2,3,3-tetrafluoro-1,4-butane diol and 2,2-dimethyl-1,3-propanediol. The tetra-substituted cyclotetra phosphazenes (3a and 3b) were solely in THF produced. Whilst, the fully substituted mono-ferrocenyl-spiro-phosphazenes (4a and 4b) were only synthesized in THF. Besides, spatial structures of 4a and 4b may resemble to the propeller and lead to the P and M isomers depending on the orientation of the four spiro rings. The structures of the compounds

*This study is supported by a grant “Scientific and Technical Research Council of Turkey” (Grant No. 215Z496).
were verified by elemental analyses, FTIR, MS, $^1\text{H}$, $^{13}\text{C}$, $^{31}\text{P}$–NMR, HSQC and HMBC techniques.

**Keywords**: Ferrocenyl–cyclotetraphosphazenes, Spectroscopy, Stereogenism

**General area of research**: Chemistry
Blue mussel shell wastes as reinforcing filler in cold vulcanizing adhesives

Deniz Akin Sahbaz1, Caglayan Acikgoz2, and Omer Mete Kockar3

1Department of Chemical Engineering, Afyon Kocatepe University, 03200, Afyonkarahisar, Turkey, denizakin@aku.edu.tr
2Department of Chemical and Process Engineering, Bilecik Şeyh Edebali University, 11230, Bilecik, Turkey, caglayanacikgoz@bilecik.edu.tr
3Department of Chemical Engineering, Anadolu University, 26555, Eskişehir, Turkey, mkockar@bilecik.edu.tr

Abstract

Cold vulcanizing adhesives are used in a range of applications, including rubber-to-rubber bonds and rubber–to–metal bondings, as well as for cold splicing of fabric conveyor belts. The adhesives are composed of two separate components which are chloroprene based rubber cement and hardener. The rubber cement contains various accelerators, activators and fillers such as carbon black, silica, calcium carbonate, talc and clay. The fillers not only reduce the cost of the material but also improve the mechanical and curing properties of the adhesives. Silica is primary used as a reinforcing filler in the production of colored rubber products. For environmental protection, many researchers have studied the utilization of waste materials as fillers. The aim of this study is to obtain a cold vulcanizing adhesive with the incorporation of blue mussel shell waste in chloroprene rubber instead of conventional calcite and silica fillers. The chemical composition of the shells is about 90% calcium carbonate by weight; this composition is similar to calcite powder, which is used as filler in rubber industry to reduce cost of products. The physical and mechanical properties of the blue mussel shell filled adhesives were comparable with those of calcite and silica filled adhesives. Cure characteristics, which are scorch time (ts2), cure time (tc90), maximum torque (MH) and minimum torque (ML) of the rubber compounds were determined at 190°C with a Moving Die Rheometer to investigate the effects of the fillers on the curing behaviours of the rubber blends. Blue mussel shell filled chloroprene rubber blends showed superior vulcanization characteristics by
the increasing of cure rate index (CRI) with the reducing of cure time and scorch time. More importantly, incorporation of blue mussel shell wastes as filler provides substantial enhancement in the adhesion properties of cold vulcanizing adhesives.

**Keywords**: Blue mussel shell, Chloroprene rubber, Cold vulcanizing adhesive, Reinforcing filler

**General area of research**: Chemistry
Effect of juglone allelochemical on seed germination and seedling growth of zucchini (Cucurbita pepo) and eggplant (Solanum melongena)

Ismail Kocacaliskan1, Tugce Akgul2, and Semiha Erisen3

1 Department of Molecular Biology and Genetics, Yildiz Technical University, Istanbul, Turkey, ikocacaliskan@gmail.com
2 Graduate School of Science, Yildiz Technical University, Istanbul, Turkey
3 Department of Molecular Biology and Genetics, Yildiz Technical University, Istanbul, Turkey, serisen@yildiz.edu.tr

Abstract

Chemical interaction mainly between plants are called allelopathy, and the organic compounds involved in allelopathy are called allelochemicals. The release of allelochemicals from plants occur by exudation from roots, leaching and volatilization from leaves and degradation of dead plant parts. Allelochemicals become stressful when they are toxic, and they are generally in toxic character. Sometimes an allelochemical produced by a plant is harmful to another plant species but beneficial to a third one. The chemical responsible for walnut allelopathy is juglone (5-hydroxy-1,4 naphthoquinone). It has generally toxic effect on plants but rarely has positive effect depend on plant species and its concentrations. However, we could not encountered any research about the effect of juglone on zucchini and eggplant which are commonly cultivated species in all the world. Therefore, in this study, it has been aimed to reveal allelopathic effect of juglone on the plant species. In this study, juglone’s allelopathic effects on seed germination and seedling growth of zucchini and eggplant were investigated in Petri dishes at 25°C. Juglone was applied in four different concentrations (0.001mM, 0.01mM, 0.1mM, 1mM) and distilled water was used as control. Germination of the seeds were recorded at seventh day and length and weights of the seedlings were also measured. In conclusion; juglone was found to decrease both seed germination and seedling growth of zucchini and eggplant species. However, it has caused much more inhibiton in eggplant than zucchini. The inhibition
was increased with increasing juglone concentrations. Even that 1 mM juglone was seen to inhibit completely seed germination and seedling growth of eggplant.

**Keywords**: Allelopathy, Eggplant, Germination, Juglone, Seedling growth, Zucchini

**General area of research**: Biology
ID–ICFAS2016: 1081

Effects of thunder sound, light flash and electric fields on seed germination of wheat (Triticum aestivum), sunflower (Helianthus annuus) and pigweed (Amaranthus retroflexus)

Muhsin Arslan1, Irfan Terzi2, and Ismail Kocacaliskan3

1 Kutahya Imam Hatip High School, Kutahya, Turkey, muhsin11@gmail.com
3 Department of Molecular Biology and Genetics, Yildiz Technical University, Istanbul, Turkey, ismailkc@yildiz.edu.tr

Abstract

In nature, seeds of plants commonly germinate in spring season and the sky events such as flash, thunder and electrical field production frequently occur in the same season. Therefore, the aim of this research was to reveal if there is a relation between seed germination and the sky events. Thus, the effects of thunder sounds, light flash and electrical fields on seed germination and post germinative seedling growth of wheat, sunflower and pigweed plant species were investigated in this study. The seeds were exposed to different thunder sounds, light flashes and electrical fields. As a result, seed germination was significantly increased by the sounds and flash treatments in pigweed. Seedling elongation were nonsignificantly enhanced by the same treatments in sunflower and wheat. On the other hand, electrical field produced by alternative current (AC) and direct current (DC) slightly increased seed germination and seedling elongation of pigweed and sunflower. Electrical field of DC was only seen to enhance seedling elongation in wheat. In conclusion, high level of the thunder sounds has generally showed negative effect but its low and middle levels have showed positive effects on seed germination. The effects of the treatments were also seen to be changed depending on plant species. According to our results, a relation between seed germination and
the sky events may be exist. But it is so early to mention for an exact relation and we need to carry out new researches in this subject to define the relation.

**Keywords**: Electrical field, Flash, Pigweed, Seed germination, Sunflower, Thunder, Wheat

**General area of research**: Biology
ID–ICFAS2016: 1084

Effects of walnut leaf extracts prepared in different solvents on seed germination and seedling growth of wheat (*Triticum vulgare*) and cress (*Lepidium satium*)

**Berna Kilic**¹, Irfan Terzi², and Ismail Kocacaliskan³

¹ Teacher of Science and Technology, Middle School of Turkiye Komur Isletmeleri, Bursa, Turkey, bklc@windowslive.com
² Dumlupinar University, Kutahya, Turkey, iterzi@dumlupinar.edu.tr
³ Department of Molecular Biology and Genetics, Yildiz Technical University, Istanbul, Turkey, iocacaliskan@gmail.com

**Abstract**

Walnut extrcats are used in allelopathic researches because of its juglone content. It has also been shown to have herbicidal, antimicrobial and antioxidant activities. Several solvents such as distilled water, methanol, ethanol and aseton are commonly being used to prepare walnut extract. However, which solvent is more efficient for the extraction is unclear. Therefore, effects and comparison of walnut leaf extracts prepared in six different solvents “water, ethanol, methanol, aseton, tetrahydrofuran (THF) and dimethyl sulfoxide (DMSO)” on seed germination and post-germinative seedling growth of wheat and cress have been investigated in this study. Walnut extracts were prepared from leaves of walnut (*Juglans regia* L. cv Yalova-2). Since juglone content in the walnut leaves is the highest level in August, the leaves were picked in the middle of August. Seeds of the wheat and cress were germinated in Petri dishes at 25°C in distilled water as control or in the extracts prepared in the solvents. Germination of the seeds were recorded at fifth day and length and weights of the seedlings were also measured. In conclusion; DMSO extract was seen to inhibit seed germination and seedling growth in both wheat and cress with respect to control. Among the treatments, the most inhibitory effect was found to has DMSO extract which decreased significantly seedling growth of cress about ten times according to control.
The other extracts of solvents also decreased seedling growth but much more lesser than that of DMSO. Thus, we suggest that DMSO may be more efficient and proper solvent in extraction of walnut leaf.

**Keywords**: Cress, Seed germination, Seedling growth, Solvents, Walnut leaf extracts, Wheat

**General area of research**: Biology
Applying and importance of the microbiology in the environmental sciences and treatment technologies

Ahmet Celebi

Department of Environmental Engineering, Sakarya University, 54187, Sakarya, Turkey,
ahmetc@sakarya.edu.tr

Abstract

One of the fastest developing field of the science is Microbiology and it has been more useful day by day in many side of daily life including many related topics of Environment and Human. Microbiology is fundamental side of Biology and now has many subdisciplines such as Bacteriology, Mycology, Protozoology, Virology, Evolutionary Microbiology, Nano microbiology etc. Microbiology has also wide range of applying sciences included Environmental Microbiology. Microorganisms or unseen organisms were hypothesized for many centuries before their actual discovery. Their life was postulated by many important scientist in history such as Mahavira, Ibni Sina (Avicenna) since 6th century. Today Bioremediation, biotechnology, biogenetic studies are useful for quality life in terms of protection of the Earth and supply food, water and environment for ecosystem. The purpose of the present study is to show importance of the environmental microbiology, its trends and existing situation of this field. For this aim, many application and high technology examples was shown. Although today researches have Nano scale technologies, biotransformation, biodegradation... and their standards, all these fields have originated from same fundamental basis. As result Fundamental sciences and their principles are still vital and today technologies have to use and consider these sciences (Biology, Chemistry, Physics and Math) together and interdisciplinary. Environmental microbiology applications are proved as a good example.

Keywords : Microbiology, Environment, Management, Applications

General area of research : Biology, Chemistry
Gene therapy and stem cell interventions: A bioethical perspective

Esma Ulusoy¹, Tolga Guven², and Semiha Erisen³

¹Department of Molecular Biology and Genetics, Faculty of Sciences, Yildiz Technical University, Esenler, Istanbul, Turkey, 
eresmet@gmail.com

²History of Medicine and Ethics, School of Medicine, Marmara University, Istanbul, Turkey

³Department of Molecular Biology and Genetics, Faculty of Sciences, Yildiz Technical University, Esenler, Istanbul, Turkey, 
serisen@yildiz.edu.tr

Abstract

Developments from the near past of medical sciences suggest that new technologies that promise revolutionary advances in medical care can always present with new and unique ethical problems. For instance, the availability of mechanical ventilation brought up ethical issues such as the right to refuse treatment and the right to die. Gene therapy and stem cell interventions are no exception to this rule and this paper aims to define some of the ethical issues associated with these newer technologies.

For this purpose, we will first examine the experimental nature of these interventions and what this experimental nature implies with regard to the principle of respect for autonomy.

We will then address these technologies from the aspect of social justice and fair distribution of resources. We will also examine the concepts of positive and negative eugenics in this context and we will point out the need for increasing the awareness of health care professionals with regard to these concepts.

Finally, we will examine the concept of being “normal” and by focusing on the value-laden nature of this term, we will emphasize the difficulty of relying on this term as an objective basis for medical interventions. We will also examine the potential problems that can arise when the term “normal” is understood as a purely biological concept that can only be defined by health care professionals.

We will conclude that these new medical technologies will inevitably present new and unique ethical challenges. Therefore, before we attempt
to label any of these interventions as “miraculous” it is imperative that we strive to develop ethical guidelines and legal frameworks that address these challenges.

**Keywords**: Gene therapy, Stem cell, Bioetic, Ethical

**General area of research**: Biology
Allelopathic effects leachate extracts of an invader plant species (*Lythrum salicaria* L.) on seed germination and seedling growth of lettuce

**Betul Akin**¹, Nuket Bingol², Sema Leblebici³, and Ismail Kocacaliskan⁴

¹Department of Biology, Dumlupinar University, Kutahya, Turkey, bortaca@yahoo.com
²Department of Biology, Dumlupinar University, Kutahya, Turkey, nuket.abingol@dpu.edu.tr
³Department of Garden Plants, Seyh Edebali University, Bilecik, Turkey, sema.leblebici@bilecik.edu.tr
⁴Department of Molecular Biology and Genetic, Yildiz Technical University, Istanbul, Turkey, ismailkc@yildiz.edu.tr

**Abstract**

*Lythrum salicaria* is an invader plant species lives in wetland areas. But the mechanism of its invading property is not known yet. This species may have some toxic allelochemicals and may exudes them into the environment. Thus, it may suppress the growth of neighbour plants and so that it may invades the habitat. The release of allelochemicals from plants occur by exudation from roots, leaching and volatilization from leaves, and degradation of dead plant parts. The aim of this study was to reveal allelopathic effect of *L. salicaria* on lettuce (*Lactuca sativa* L.) as a test plant. Effects of leachate extracts on seed germination and seedling growth of lettuce seeds were investigated in Petri dishes at 25°C. The seeds were collected from the plants along Porsuk river, Kütahya and were sowed into the pots filled with soil and placed in a pool filled with water in a greenhouse. The plants were grown in this conditions until to have about 30 leaves then brought to laboratory and root, shoot and leaves of the plants were separated. 10 g of plant parts were lefted in 100 ml distilled water and kepted at 25°C in an incubator for 1,3,5,7,15 and 30 days to obtain leachate extracts. The lettuce seeds were germinated in Petri dishes at 25°C in distilled water as control or in the extracts obtained from different parts of *L. salicaria* plants. Germination of lettuce seeds were recorded at day 10 and length and weights of the
seedlings were also measured. In conclusion; although lettuce seed germination was not significantly affected by the extracts, root and shoot elongation and fresh and dry weights of lettuce seedlings were significantly decreased by the extracts. Especially, the extracts obtained from 15 and 30 days kepted *L. salicaria* plant parts were seen to have more growth inhibitory effect. As a result, invading property of *L. salicaria* may be originated from its dominant allelopathic effect.

**Keywords**: Allelopathy, Germination, Lettuce, *Lythrum salicaria*, Seedling growth

**General area of research**: Biology
Marker assisted selection for resistance to tomato spotted Wilt virus in tomato genotypes by SCAR and CAPS markers

YILMAZ KAYA1, ZAFER SECGIN2, AND AHMET OKUMUS3

1 Department of Agricultural Biotechnology, Faculty of Agriculture, Ondokuz Mayis University, Samsun, Turkey, Yilmaz.kaya@omu.edu.tr
2 Department of Agricultural Biotechnology, Faculty of Agriculture, Ondokuz Mayis University, Samsun, Turkey, zafer.secgin@omu.edu.tr
3 Department of Agricultural Biotechnology, Faculty of Agriculture, Ondokuz Mayis University, Samsun, Turkey, aokus@omu.edu.tr

Abstract

Viruses are one of the most effective harmful organism to be cause of the valuable crops. Tomato spotted wilt virus (TSWV) causes serious diseases of many economically crops such as tomato and lettuce. The TSWV pathogen of tomato was first described in Turkey in 1960. The symptoms of TSWV in tomato vary depending on the stage of growth that the tomato is infected, co-infections with other pathogens and the cultivar, and the virus may constitute loss efficiency from 40% to 100%. TSWV may affect both the quality and quantity of tomato products. The virus is very affective on tomato in Samsun province of Turkey. The use of tomato plants possessing the SW-5 resistance gene is the most efficient method to control the virus in the crops. Samples were collected and tested using marker technology by SCAR and CAPS markers. The SW-5 genes confers resistance to TSWV in tomato plants. Present study was carried out in the Agricultural Biotechnology laboratory of Ondokuz Mayis University in 2016. Furthermore those tomato genotypes were screened for their resistance or susceptible, homozigot or heterozigot resistant by using related primers. According to results one tomato genotypes were determined as resistant plants to TSWV. The data
showed a clear correlation between SCAR and CAPS markers. It was concluded that those tomato genotypes could be used in tomato breeding for resistance TSWV.

**Keywords**: Tomato spotted Wilt virus, Tomato, SCAR, CAPS

**General area of research**: Biology
Comparision of genes with increased expression in leaves of common bean grown under organic and conventional conditions

Mine Kucak¹, Ozlem Turan², and Senay Vural Korkut³

¹Department of Molecular Biology and Genetics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, mpeksoy@yildiz.edu.tr
²Department of Molecular Biology and Genetics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, ozlemtur_87@hotmail.com
³Department of Molecular Biology and Genetics, Faculty of Arts and Science, Yildiz Technical University, Istanbul, Turkey, senay_vural@yahoo.com

Abstract

The vast majority of world population, supply their protein demand from cereals. The largest amount of protein can be obtained the granular leguminous seeds among vegetable protein sources. Bean (Phaseolus vulgaris L.) is important member of leguminous in Turkey. Conventional agriculture is a type of agricultural production which makes it possible to use chemical pesticides, fertilizers, hormones and genetically modified seed but these are forbidden in organic agriculture. Interest in organic agriculture has been increasing globally because of its advantages such as prevention of environment pollution, biodiversity conservation, reduced fossil fuel consumption and more nutritious products.

Suppression Subtractive Hybridization (SSH) is comparing with two samples’ different genes by means of PCR method.

In this study; genes which are expressed in conventionally produced plants were compared with genes which are expressed in organically produced plants. Total and mRNAs were isolated from conventionally and organically produced plants. mRNAs were transferred to cDNAs. cDNA library were established by using SSH method. Then sequence analysis and bioinformatics analyses were carried out.

Bioinformatics analyses indicated that genes that show similarity to certain genes encoding important proteins including fructose biphosphate aldolase, acid phosphatase, glyceraldehyde - 3 - phosphate dehydrogenase protein
families matched with conventionally produced plants; NAC transcription factors, β-Mannase, F-box proteins and aldolase enzyme.

**Keywords**: Bean (*Phaseolus vulgaris* L.), SSH, Conventional agriculture, Organic agriculture, Bioinformatics analyses

**General area of research**: Biology
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Posters

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Singular quasilinear elliptic systems with (sub–, super–) homogeneous condition

**Brahim Khodja**¹, Hana Didi², and Abdelkrim Moussaoui³

¹ Department of Mathematics, Badji-Mokhtar Annaba University, Annaba, Algeria, brahim.khodja@univ-annaba.org

² Department of Mathematics, Badji-Mokhtar Annaba University, Annaba, Algeria, hana.di@hotmail.fr

³ Department of Biology, A. Mira Bejaia University, Targa Ouzemour, 06000, Bejaia, Algeria, abdelkrim.moussaoui@univ-bejaia

**Abstract**

In this talk we establish existence, nonexistence and regularity of positive solutions for a class of singular quasilinear elliptic systems subject to (sub–, super–) homogeneous condition. The approach is based on sub-supersolution methods for systems of quasilinear singular equations combined with perturbation arguments involving singular terms.

**Keywords**: Singular system, $p$–Laplacian, Sub-supersolution, Schauder’s fixed point theorem, Regularity

**General area of research**: Mathematics
Variational inequalities for solid mechanical contact problems

Frekh Taallah

Department of Mathematics, Badji-Mokhtar Annaba University, 23000 Annaba, Algeria,
frekh2003@yahoo.fr

Abstract

Several problems in mechanics, physics, control and those dealing with contacts, lead to the study of systems of variational inequalities. In this study we considered a deformed elastic solid with a unilateral contact of a rigid body. This model has been studied by Lions, J. L. and G. Stampacchia [J. L. Lions, G. Stampacchia, Variational inequalities, Comm. Pure Appl. Math. 20 (2005) 493–519]. In this paper, we studied the existence, uniqueness and continuity of the deformation of this solid with respect to the data.

Keywords : Contact, Variational inequalities, Finite element method

General area of research : Mathematics
Comparison of some set open and uniform topologies on $C(X,Y)$

Kelaiaia Smail$^1$ and Harkat Lamia$^2$

$^1$Department of Mathematics, Annaba University, Annaba, Algeria, kelaiaiasmail@yahoo.fr

$^2$Department of Mathematics, Souk-Ahras University, Algeria, harkat_lamia@yahoo.fr

Abstract

Let $X, Y$ be topological spaces and $C(X,Y)$ be the set of all continuous functions from $X$ to $Y$. The set $C(X,Y)$ can be endowed with set open or uniform topologies on particular families of subsets of $X$. We give here a comparison between some of these topologies and give a criterion for their coincidence.

Keywords: Function spaces, Set open topology, Uniform topology, $Y$–compact sets

General area of research: Mathematics
Cloud interaction and safety features of mobile devices

Mirsat Yesiltepe¹ and Muhammet Kurulay²

¹Department of Mathematical Engineering, Yildiz Technical University, Istanbul, 34220, Turkey, mirsaty@yildiz.edu.tr
²Department of Mathematical Engineering, Yildiz Technical University, Istanbul, 34220, Turkey, mkurulay@yildiz.edu.tr

Abstract

In this study, two current popular mobile operating system, still in relation to the concept of cloud began to supplant the internet almost word today, the differences, the concept of cloud security mechanisms they use for themselves and are dealt with in this environment. One of comparing mobile operation system is representing open source and the other for close source one.

Keywords: Cloud, Communication protocols, Protocol layers, HTTP pooling

General area of research: Mathematics
Weak solutions of first-order differential inclusions in Banach space

Khouni Yassine

Faculty of Life and Natural Science, University of Batna 2, Fesdis, Batna, Algeria,
yacinespoire@yahoo.fr

Abstract

The aim of this paper is to investigate the existence of pseudo–solutions for a first–order multivalued differential equation with nonlocal integral boundary condition in a Banach space of the following form

\[ x'(t) \in F(t, x(t)) \quad \alpha; \quad t \in [0, T] \]

\[ x(0) + \int_0^T x(s) \, ds = x(T) \]

Our approach is based on the use of the technique of measures of weak noncompactness and a fixed point theorem of Mönch type.

Keywords: Pseudo–solutions, Differential inclusions, Integral boundary condition, Measure of weak noncompactness, Pettis integral

General area of research: Mathematics
Integral representation of the generalized and the classical Bessel linear functional

Ammar Boukhemis\textsuperscript{1}, Karima Ali Khelil\textsuperscript{2}, and Ridha Sfaxi\textsuperscript{3}

\textsuperscript{1}Department of Mathematics, Faculty of Sciences, University Badji Mokhtar–Annaba, P.O. 12, Annaba, 23000, Algeria, aboukhemis@yahoo.com

\textsuperscript{2}Department of Mathematics, Faculty of Sciences, University Badji Mokhtar–Annaba, P.O. 12, Annaba, 23000, Algeria, kalikhelil@gmail.com

\textsuperscript{3}College of Education of Girls, Scientific Sections, University of Hafr–Al–Batin, Saudi Arabia, ridhasfaxi@gmail.com

Abstract

In this work, we are interested by the integral representation results of the generalized Bessel linear functional $B[v]$ given by the authors in \cite{A. Ghressi, L. Kheriji, Some new results about a symmetric D–semi–classical linear form of class one, Taiwanese J. Math. 11(2) (2007) 371–382}, for all $v \geq 1/2$. We extend this result for all $v \geq 0$. Based on a new connection formula between $B[v]$ and $B[v+m]$, for each integer $m \geq 1$, we built an integral representation of $B[v]$, for all $v < 0$ and $v \neq -n$, $n \geq 1$. Finally, the connection formula between $B[v]$ and the classical Bessel linear functional $B[\alpha]$ allows us to obtain an integral representation of $B[\alpha]$, for all real number $\alpha \neq -n/2$, $n \geq 0$.

Keywords: Linear functional, Integral representation, Semi-classical functional, Incomplete gamma function, Exponential integral

General area of research: Mathematics
Existence and nonexistence for nonlinear problems with singular potential

Boumediene Abdellaoui and Biroud Kheireddine

Abou Bakr Belkaid University of Tlemcen, Algeria,
kh_biroud@yahoo.fr

Abstract

Let $\Omega$ be a bounded regular domain of $\mathbb{R}^N$, we consider the following class of elliptic problem

$$
\begin{cases}
-\Delta u = \frac{u^q}{d^2} & \text{in } \Omega \\
u > 0 & \text{in } \Omega \\
u = 0 & \text{on } \partial \Omega
\end{cases}
$$

where $1 < q < 2^* - 1$ ($2^*$ is critical Sobolev exponent). We investigate the question of existence and nonexistence of positive solution depending of the rang of the exponent $q$.

Keywords: Hardy inequality, Nonlinear problem singular weight

General area of research: Mathematics
Existence of minimal and maximal solutions for a second order quasilinear dynamic equation with integral boundary conditions

Nehari Mohamed

Dynamic Systems and Applications Laboratory, Preparatory School of Economy
B.P.119, Tlemcen, Algeria,
Nehari_72@yahoo.fr

Abstract

This work is concerned with the construction of the minimal and maximal solutions for a second order quasilinear dynamic equation with integral boundary conditions, where the nonlinearity is a continuous function. We also give an example to illustrate our results.

Keywords: Integral boundary conditions, Upper and lower solutions, Monotone iterative technique, Time scale, p–Laplacian

General area of research: Mathematics
Existence and uniqueness solution for an integro-differential nonlinear Volterra equation

Segni Sami and Guebbai Hamza

Department of Mathematics, Guelma University, Algeria, segnianis@gmail.com

Abstract

In this work we study the solution’s existence and uniqueness for an integro-differential nonlinear Volterra equation and then we approximate the solution of this equation by using Nyström method.

Keywords : Integro-differential equation, Volterra equation

General area of research : Mathematics
Stability and hyperstability of functional equations

ABBAS NAJATI

Department of Mathematics and Applications, Faculty of Mathematical Sciences, University of Mohaghegh Ardabili, P.O.Box 179 Ardabil, Iran, a.nejati@yahoo.com

Abstract

We study the stability and hyperstability of some functional Equations on restricted domains. We also show, under some assumptions, that a function satisfying the equation approximately must be actually a solution to it. Let us recall that the study of stability problems of functional equations was motivated by a question of Ulam. The first result of stability was proved by Hyers [D. H. Hyers, On the stability of the linear functional equation, Proc. Natl. Acad. Sci. USA 27 (1941) 222–224]. It seems that the first hyperstability result was published in [D. G. Bourgin, Approximately isometric and multiplicative transformations on continuous function rings, Duke Math. J. 16 (1949) 385–397] and concerned ring homomorphisms. However the term hyperstability was used for the first time in [Gy. Maksa and Zs. Pales, Hyperstability of a class of linear functional equations, Acta Math. Acad. Paedagog. Nyhazi. 17 (2001) 107–112].

Keywords : Stability, Hyperstability, Functional equation

General area of research : Mathematics
Stability of a pexiderized functional equation of Hosszu type

Mohammad Bagher Moghimi

Department of Mathematics and Applications, Faculty of Mathematical Sciences, University of Mohaghegh Ardabili, P.O.Box 179 Ardabil, Iran, moghimi@uma.ac.ir

Abstract

The functional equation

\[ f(x + y - xy) + f(xy) = f(x) + f(y) + f(x + y - xy) + f(xy) = f(x) + f(y) \]

was considered first by Hosszú who has solved it under a differentiability assumption. We solve the following functional equation of Hosszú type

\[ f(x - y + xy) + f(y) = f(x) + f(xy) \]

and its Pexiderized version

\[ f(x - y + xy) + g(y) = h(x) + k(xy) + f(x - y + xy) + g(y) = h(x) + k(xy). \]

We also prove the Hyers-Ulam stability of these functional equations in Banach spaces.

Keywords: Hyers-Ulam stability, Hosszu functional equation, Pexiderized functional equation

General area of research: Mathematics
Comparison of the experimental and theoretical values of 3-ethyl/n-propyl-4-[3-(3-methoxybenzoxy)benzylidenamino]-4,5-dihydro-1H-1,2,4-triazol-5-one molecules by HF and DFT methods

HILAL MEDETALIBEYOGLU1 AND HAYDAR YUKSEK2

1 Department of Chemistry, Kafkas University, 36100 Kars, Turkey, hilalmedet@gmail.com
2 Department of Chemistry, Kafkas University, 36100 Kars, Turkey, hhigh61@gmail.com

Abstract

In this study, theoretically spectral values of 3-ethyl/n-propyl-4-[3-(3-methoxybenzoxy)benzylidenamino]-4,5-dihydro-1H-1,2,4-triazol-5-one (1 and 2) were calculated and compared with experimental values. For this purpose, firstly, these compounds (1 and 2) have been optimized using B3LYP/6-311G(d) and HF/6-311G(d) basis sets. 1H-NMR and 13C-NMR spectral values according to GIAO method was calculated using Gaussian G09W program package [Frisch et al., Gaussian Inc., Wallingford, CT, 2009] in gas phase and in DMSO solvent. Theoretically and experimentally values were plotted according to $\delta_{\text{exp}} = a \cdot \delta_{\text{calc.}} + b$, Eq. a and b constants regression coefficients with a standard error values were found using the Sigma plot program. The vibrational frequency of these compounds (1 and 2) have been calculated by using 6-311G(d) basis set with DFT and HF methods and these values are multiplied with appropriate adjustment factors. The veda4f program was used in defining IR data. In addition, bond angles, bond lengths, dipole moments, the highest occupied molecular orbital-lower unoccupied molecular orbital (HOMO-LUMO) energy, Mulliken atomic charges and total energy of the molecules (1 and 2) were calculated with both methods. Finally, the calculation results were analyzed to simulate $^1$H and $^{13}$C nuclear resonance chemical shifts, infrared and UV data of these compounds (1 and 2) which shows better agreement with experimental data.

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Keywords: 4,5-Dihydro-1H-1,2,4-triazol-5-one, Gaussian 09W, 6-311G(d) basis set, DFT, HF

General area of research: Chemistry
The weathering of PC/ASA alloy for automotive exterior applications

Sinan Ozturk, Semih Erturk, Gurkan Yilmazoglu, Beyhan Haliloglu, and Halil Ibrahim Okar

TOFAS Turk Otomobil Fabrikasi A.S., Istanbul Cad. No:574, 16389, Bursa, Turkey, suleymansinan.ozturk@tofas.com.tr

Abstract

Polycarbonates (PC) are used in automotive industry due to high physical and mechanical properties like high impact resistance and ductility. Polycarbonates are blended with ABS (Acrylonitrile-Butadiene-Styrene) and ASA (Acrylonitrile-Styrene-Acrylate) terpolymers for interior and exterior applications of automotive components to achieve good physical and mechanical properties. Furthermore, the general application of amorphous thermoplastic alloys like PC/ABS is for painted parts in the dashboard and center console. Other reason for choosing such alloys is the izod impact resistance required for interior applications higher than 40kJ/m². Recently, grades of PC/ASA with UV stabilized are developed for non-painted exterior applications.

The aim of our study is to investigate whether new developed PC/ASA could be chosen for exterior applications of automotive industry. In this study, the samples are prepared from injection molding and the weathering performance of PC/ASA was tested by a weather-o-meter for 1500h at a total of 1890 kJ/m² at 340nm with a cut-off filter at λ < 290nm. The results are evaluated by FT-IR, DSC, TGA and SEM. It has been observed that UV degradation of PC/ASA leads to several major changes in its IR spectrum like broad bands occurred in the hydroxyl region around 3300 cm⁻¹, and carbonyl stretching region increased around 1728 cm⁻¹. The main degradations were based on photo-Fries rearrangement and photo-oxidation of polycarbonate. In our study, the photo-oxidation was followed by the color shift to yellowing which has been measured from L,a,b values of color data.
The study is important for understanding the performance of PC/ASA for exterior applications according to the automotive industry requirements.

**Keywords**: PC/ASA Alloy, Weathering, Photo-oxidative degradation, Automotive exterior applications, Thermoplastic

**General area of research**: Chemistry
Synthesis of phthalocyanines with four 4-(4-(2-Phenylpropan-2-yl)phenoxy) substituents

Mehmet Salih Agirtas¹, Cihan Durmus², and Beyza Cabir³

¹Department of Chemistry, Faculty of Science, Yuzuncu Yil University, 65080, Van, Turkey, salihagirtas@hotmail.com
²Department of Chemistry, Faculty of Science, Yuzuncu Yil University, 65080, Van, Turkey, cihan_chemist_1985@hotmail.com
³Department of Chemistry, Faculty of Science, Yuzuncu Yil University, 65080, Van, Turkey, arsgrvbyz@hotmail.com

Abstract

Phthalocyanines have been attracted attention for many decades because of their comprehensive applications such as photodynamic therapy, solar cells, organic light-emitting diodes, dyes, photocatalysts, gas sensor, semiconductor materials. The traditional phthalocyanine suffers from the aggregation ascribed to its intrinsic large π–conjugation. The synthesis of non-aggregation phthalocyanines have been important. In this study, free metal and metallo phthalocyanines with four 4-(4-(2-Phenylpropan-2-yl)phenoxy) groups on the periphery was prepared cyclotetramerization of 4-(4-(2-phenylpropan-2-yl)phenoxy)phthalonitrile. All the compounds were characterized by electronic absorption, elemental analysis, infrared and nuclear magnetic resonance spectroscopy. These compounds are soluble in organic solvents such as acetone, tetrahydrofuran, dichloromethane, dichloroethane, dimethyl formamide. Aggregation properties of phenylpropan-2-yl)phenoxy) substituted phthalocyanines were investigate in the tetrahydrofuran. In the study concentration range it did not show any aggregation. These findings may offer new possibilities towards to use these phthalocyanines.

Keywords : Phthalocyanine, Synthesis, Characterization, Aggregation

General area of research : Chemistry
Antimicrobial activity of the volatile oil from *Kitaibelia balansae* species

Fadime Yildirim\(^1\), Ayten Ozturk\(^2\), Zerrin Zerenler Caliskan\(^3\), Ahmet Savran\(^4\), and Meysun Ibrahim Abdullah\(^5\)

\(^1\)Department of Chemistry, Nigde University, Nigde, Turkey, fadimeyildirim42konya@outlook.com  
\(^2\)Yildiz Technical University, Department of Molecular Biology and Genetics, Istanbul, Turkey  
\(^3\)Nigde University, Department of Biotechnology, Nigde, Turkey  
\(^4\)Nigde University, Department of Biology, Nigde, Turkey  
\(^5\)Nigde University, Department of Chemistry, Nigde, Turkey

Abstract

In this work the volatile oil of the K. balansae species, collected from Konya (Turkey) were extracted by hydro-distillation and was investigated for its anti-microbial activity. The results showed good activity on the pathogenic microorganisms used. The volatile oil obtained from the stem, leaves and flowers were analyzed by GC/MS. The antibacterial activities of all the extracts were examined against five Gram-negative, one Gram-positive bacteria and one pathogenic yeast by using disc diffusion method. The results showed the presence of Manool, 8, 13-epoxy, 15, 16-Dinorlab-12-ene, 8a; 13, 13; 17 depoxy-14, 15-bisnorlabdane and tetrahydroactinidiolide, Sclareoloxide, sclareol, labda-7, 13, 14-triene, cis and trans-methylidihydrojasmonate in these extracts as well as other components.

Keywords : Kitaibelia balansae, Volatile oil, Antimicrobial activity, Microorganisms, Sclareoloxide, Sclareol

General area of research : Chemistry
The cytotoxicity evaluation of Melia azedarach extracts on human adipose Mesenchymal stem cells

Burcu Efe1, Yusuf Furkan Galata2, Yavuz Emre Arslan3, and Ali Umit Yener4

1 Regenerative Biomaterials Laboratory, Department of Bioengineering, Canakkale Onsekiz Mart University, 17100, Canakkale, Turkey, efeburcu@outlook.com.tr
2 Regenerative Biomaterials Laboratory, Department of Bioengineering, Canakkale Onsekiz Mart University, 17100, Canakkale, Turkey, furkangalata@outlook.com
3 Regenerative Biomaterials Laboratory, Department of Bioengineering, Canakkale Onsekiz Mart University, 17100, Canakkale, Turkey, emre.arslan@comu.edu.tr
4 Department of Cardiovascular Surgery, Canakkale Onsekiz Mart University, 17100, Canakkale, Turkey, yener@comu.edu.tr

Abstract

Medicinal plants are an important source and used for several crucial medicinal treatments [S. S. Handa, S. P. S. Khanuja, G. Longo, D. D. Rakesh, United Nations Industrial Development Organization and the International Centre for Science and High Technology, 2008, Italy]. Due to their potential biological properties such as anti-fungal, anti–bacterial, hepatoprotective, anti–oxidant, etc., extracts have been studied intensively [S. Sultana, H. M. Asif, N. Akhtar, M. Waqas, S. U. Rehman, Comprehensive review on ethanobotanical uses, phytochemistry and pharmacological properties of Melia azedarach linn, Asian J. Pharmaceut Res. Health Care 6(1) (2014) 26–32]. Attributes of Melia azedarach have been investigated in various areas and total phenolic content, cytotoxic and anti–microbial effects have been evaluated by lots of scientific communities [I. Khan, M. M. Yasinzi, Z. Mehmood, I. Ilahi, J. Khan, A. T. Khalil, M. S. Saqib, W. U. Rahman, Comparative study of green fruit extract of Melia azedarach linn. with its ripe fruit extract for antileishmanial, larvicidal, antioxidant and cytotoxic activity, American

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In this study, aqueous extracts of *M. azedarach* leaves and fruits were prepared, total phenolic content and antioxidant activities were determined by spectrophotometric methods, GC–MS analysis was used to identify its biological content and the cytotoxic activities of the extracts were evaluated on human adipose mesenchymal stem cells (hAMSCs) using XTT assay. As a result, it has been found that the fruit extract has more cytotoxic activity than leaf extract on hAMSCs.

**Keywords**: *Melia azedarach*, Extraction, Cytotoxicity, Human adipose mesenchymal stem cells

**General area of research**: Chemistry
Fabrication of human hair keratin/jellyfish collagen 3D−scaffolds for tissue engineering applications

TUGBA SEZGIN ARSLAN¹, YAVUZ EMRE ARSLAN², AND AHMET LUTFI UGUR³

¹Department of Bioengineering, Canakkale Onsekiz Mart University, 17100, Canakkale, Turkey, tsezgin16@gmail.com
²Department of Bioengineering, Canakkale Onsekiz Mart University, 17100, Canakkale, Turkey, yavuzea@gmail.com
³Department of Materials Science and Engineering, Canakkale Onsekiz Mart University, Turkey, alugur@comu.edu.tr

Abstract

In order to repair damages tissues, the field of tissue engineering utilizes the principles of engineering and the life sciences. Tissue engineered scaffolds (TES) are very crucial since they can mimic the micro-environment. They can also guide to stem/cells for attachment, migration and proliferation. Numerous biopolymers such as silk fibroin, collagen, chitosan, fibrinogen and gelatin are used for this purpose [B. Dhandayuthapani, Y. Yoshida, T. Maekawa, D. S. Kumar, Polymeric scaffolds in tissue engineering application: a review, Int. J. Polym. Sci. (2011) 1-19]. Recently keratin, which is the major component of hair, feathers, wools, nails and horns has become a prominent candidate to construct TES for regenerative medicine applications due to its unique properties [H. Lee, K. Noh, S. C. Lee, Il-K. Kwon, D.-W. Han, In-S. Lee, Yu-S. Hwang, Human hair keratin and its-based biomaterials for biomedical applications, Tissue Eng. Regen. Med. 11(4) (2014) 255-265]. In this study, Pepsin-soluble Collagen from Rhizostoma pulmo and keratin fragments from human hair were dissolved in distilled water. Collagen and collagen/keratin spongy scaffolds were fabricated via freeze-drying technique. The resultant spongy 3D−TES were characterized as the physicochemical and biochemical. Human adipose-derived mesenchymal stem cells

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were seeded onto these spongy 3D-TES and cell viability was assessed by MTT based mitochondrial dehydrogenase activity test. Cell attachment on these surfaces was also analyzed by SEM.

**Keywords**: Human adipose-derived Mesenchymal stem cells, Keratin, Jellyfish collagen, Scaffold, Tissue engineering

**General area of research**: Chemistry
Transport of Cr(VI) from industrial waste water by using a polymer inclusion membrane (PIM) modified with nanomaterial graphene oxide

Canan Onac\textsuperscript{1}, Ahmet Kaya\textsuperscript{2}, and H. Korkmaz Alpoguz\textsuperscript{3}

\textsuperscript{1}Department of Chemistry, Pamukkale University, Denizli, Turkey, canan.onac@hotmail.com
\textsuperscript{2}Department of Chemistry, Pamukkale University, Denizli, Turkey, ahmetk@pau.edu.tr
\textsuperscript{3}Department of Chemistry, Pamukkale University, Denizli, Turkey, hkalpoguz@pau.edu.tr

Abstract

In this study, it has been purposed and inquired that the transport of Cr(VI) through the PIM modified with graphene oxide (GO) from industrial waste waters. A new generation of carbon nanomaterials are the most important ingredients that affect the membrane performance in the production of nano-reinforced membranes. The membrane was modified with GO which improves the mechanical properties and permeability of the PIMs. Important outcomes of this work are high permeability, seamless porous structure, high selectivity and development of PIM by minimized nano-reinforced against pollution in addition of the unique physical properties of GO. The transport of Cr(VI) was achieved over 90\% under optimized conditions from a chrome plating bath water to the acceptor phase that contained a buffer solution through PIM by adding GO which incremented the features of membrane. The transport of Cr(VI) was achieved from the chromate plating water as a results of transport experiments performed on different parameters by determining the optimum conditions. The GO/PIM was characterized with FT-IR spectroscopy and AFM techniques. The usage of this system is very commercial for industrial waste water applications due its high resistant.

\textsuperscript{*}This research is supported by TÜBİTAK (The Scientific and Technological Research Council of Turkey). Project number: 115Y109
PIM/GO exhibits great stability and selectivity in the presence of other metals in chrome plating bath water for the recovery of chromium and the system can be applied on the real samples.

**Keywords**: Industrial waste waters, Graphene oxide, Polymer inclusion membrane, Cr(VI)

**General area of research**: Chemistry
Synthesis, characterization, spectral, aggregation and fluorescence and improved photophysical properties of (ethylsulfanyl) porphyrazines Containing \((bpy)_2Ru^{II}\)

Fatma Aytan Kilicarslan\(^1\), Ali Erdogmus\(^1\), Sabiha Manav Yalcin\(^1\), and Ahmet Gul\(^2\)

\(^1\)Department of Chemistry, Yildiz Technical University, Esenler, 34210, Istanbul, Turkey, faytank@hotmail.com

\(^2\)Department of Chemistry, Technical University of Istanbul, 80626 Maslak, Istanbul, Turkey

Abstract

Porphyrazines share structural similarities with porphyrins and phthalocyanines. They have diverse applications such as biomedical agents for diagnosis and therapy, precursors to new conducting materials, chemical sensors, ladder polymers and dyes [T. P. Forsyth, D. B. G. Williams, A. G. Montalban, C. L. Stern, A. G. M. Barret, B. M. Hoffman J. Org. Chem. 63(331) (1998)]. Of much interest to this class of compounds is the role they play as potential photosensitisers in the treatment of tumors, a process known as photodynamic therapy (PDT) [P. Kubat, J. Mosinger J. Photochem. and Photobiol. A: Chem. 96(93) (1996)].

In this study, (ethylsulfanyl) porphyrazines have been modified with one peripheral ruthenium bipyridine groups. These compounds possess \((bpy)_2Ru^{II}\) moieties directly attached to the position in the (ethylsulfanyl) porphyrazines through thioether chelation. The new compounds have been characterized by elemental analysis, FT-IR, 1H-NMR spectroscopy and mass spectra. The spectral properties such as electronic spectra, aggregation and fluorescence of compounds have been studied in THF. Insertion of \((bpy)_2Ru^{II}\) moiety on the porphyrazines structure have been investigated photophysical properties of the complexes.
Synthetic route of a new dinuclear porphyrazines

**Keywords**: Porphyrazines, Bipyridine, Ruthenium, Fluorescence, Photophysics

**General area of research**: Chemistry
Synthesis, characterization, aggregation and electrochemical properties of fluoro functionality phthalocyanines

Fatma Aytan Kilicarslan¹, Bahadir Keskin¹, Ali Erdogmus¹, and Ibrahim Erden¹

¹Department of Chemistry, Yildiz Technical University, Esenler, 34210, Istanbul, Turkey, faytank@hotmail.com

Abstract

Phthalocyanines are interesting class of materials. They have been researched with great interest by chemists, physicists, and industrial scientists due to their unique high stability, architectural flexibility, diverse coordination properties, good spectroscopic characteristics, and rich and reversible redox chemistry. The unique properties of the Phthalocyanines lead to their use in different applications such as medicine, optical communication, gas sensors, photoconducting agents, chemical sensors, molecular metals, liquid crystals, non-linear optics, catalysis, and most importantly they are utilized as stand-alone or composite semiconductor materials. Interestingly, the physicochemical characteristics of the phthalocyanines can be precisely altered by modifying the central metal ion and the substituent at the periphery of the benzene rings [M. G. Walter, A. B. Rudine, C. C. Wamser, J. Porphyrins Phthalocyanines 14 (2010) 759–792].

The synthesis, characterization, aggregation and electrochemical properties of [bis(4-fluorophenyl)-methoxy] substituted phthalocyanines were reported for the first time. The new compounds have been characterized by elemental analysis, UV-Vis, FT-IR, ¹H-NMR and mass spectra. The aggregation behavior of the phthalocyanine compounds were investigated in different solvents and concentrations. Electrochemical properties of peripherally Co and Cu complexes were examined to determine effect of the [bis(4-fluorophenyl)-methoxy] substituents. The fluoro substitution of the complexes shifted the redox processes toward the negative potentials and complexes gave more reversible processes. While CuPc complexes gave Pc ring
based electron transfer reactions, metal based reduction and oxidation reactions were also recorded with CoPc complex. It can be easily concluded that the results of the voltammetric measurements supported the proposed structure of the complexes.

**Keywords**: Phthalocyanines, Aggregation, Electrochemistry, Flourine

**General area of research**: Chemistry
Green synthesis of Au / Ag Bimetallic Nanoparticles by pyrus malus fruit extract

IREM ERGIN\textsuperscript{1} AND SEMIHA CAKIR\textsuperscript{2}

\textsuperscript{1}General Directorate of Mineral Research and Exploration, Department of Marine Research, Turkey, irem.ergin@mta.gov.tr

\textsuperscript{2}Department of Chemistry, Faculty of Science, Gazi University, 06500, Teknikokullar, Ankara, Turkey, scakir@gazi.edu.tr

Abstract

A nontoxic, simple and eco–friendly method for the synthesis of Au / Ag bimetallic nanoparticles has been developed. HAuCl\textsubscript{4} and AgNO\textsubscript{3}, as a metal precursor and Pyrus Malus Fruit (PMF) extract as reducing agent have been used. Biosynthesis of Au / Ag metallic nanoparticles are closely related with bioextract type, bioextract concentration, HAuCl\textsubscript{4} and AgNO\textsubscript{3} / bioextract ratio, pH, reaction time, reaction temperature. Ensuring the stability of the metal nanoparticles is another important step of biosynthesis. The optimal experimental conditions for green synthesis by determining Au / Ag bimetallic nanoparticles were successfully synthesized in aqueous solution. The obtained colloidal solution is characterized by Ultraviolet–Visible Spectrophotometer (UV–VIS), Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscope (SEM), X–ray photoelectron spectroscopy (XPS) and Energy Dispersive X–Ray (EDX). The absorption peaks of surface plasmon bands obtained for Au, Ag and Au/Ag solution at 530, 410 and 450 nm, respectively. FTIR spectra of Au / Ag nanoparticles exhibited two peaks at 3296.49 cm\textsuperscript{-1} (OH group) and 1634.24 cm\textsuperscript{-1} (C=O group). SEM, XPS and EDX analysis of nanoparticles confirmed the presence of Au, Ag and Au/Ag alloy in prepared spherical nanostructures.

\textbf{Keywords} : Green synthesis, Bimetallic nanoparticles

\textbf{General area of research} : Chemistry
ID–ICFAS2016: 1209

Preparation of Pt-free polypyrrole electrodes and characterization

Dogan Cirmi, Rukan Suna, Rezzan Aydin, and Fatih Koleli

1Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, dogancirmi@hotmail.com
2Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, rukansuna@hotmail.com
3Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, rezzanaydin@mersin.edu.tr
4Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, fkoleli@mersin.edu.tr

Abstract

Conducting polymers (and nanomaterials) have gathered great interest in electronic devices, capacitors and potential applications of catalyst. In order to use conductive polymers instead of metals maintains as electrocatalysts. Polypyrrole is one of the most studied conductive polymer due to high conductivity and easy synthesis. Conducting polymers can obtain by electrochemical synthesis methods are usually synthesized on a support material such as Pt.

In this work, we synthesized polypyrrole nanoparticles that didn’t contain support material. Synthesis process was made in solution containing FeCl3, I2 and ethanol by chemical methods and with moulding prepared like electrode. A typical porosity and size of the polypyrrole nanoparticles was investigated by the scanning electron microscopy (SEM) and was measured conductivity. SEM image has been observed that the particle size of polypyrrole nanoparticles was about 30–100 nm (Fig 1) and conductivity of polypyrrole electrode was determined 6.2x10–2 ± 0.0004 S/cm. Basic diagram of polypyrrole was investigated in 0.1 M H2SO4 and the electrode has been observed similar activity Pt support electrode. The next study, the behavior in cathodic region of the electrode was studied due to electrocatalytic activity on CO2 reduction of polypyrrole electrode will investigate. It
is considered to be of hydrogen adsorption that seen cathodic current in the range from -0.4 to -0.7 V (Fig 2).

Fig 1. SEM image of Polypyrrole nanoparticles

Fig 2. Cyclic voltammogram of polypyrrole electrode in 0.1 M $H_2SO_4$; scan rate : $10\ mV\ s^{-1}$

**Keywords**: Polypyrrole, Cyclic voltametry, Conducting polymers

**General area of research**: Chemistry
ID–ICFAS2016: 1212

Pt-free electrodes: Development and usage of a polyaniline electrode for controlled hydrogen evolution reaction

Rukan Suna Karatekin¹, Dogan Cirmi², Fatih Koleli³, and Rezzan Aydin⁴

¹Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, rukansuna@hotmail.com
²Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, dogancirmi@hotmail.com
³Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, dfkoleli@mersin.edu.tr
⁴Department of Chemistry, Faculty of Science and Letters, Mersin University, 33343, Mersin, Turkey, rezzanaydin@mersin.edu.tr

Abstract

Hydrogen is considered to be an ideal energy carrier in the future. It can be obtained via methods such as thermolysis, steam reforming from hydrocarbons and electrolysis. Electrolysis is the most promising method for production of hydrogen (water-electrolysis by using electrical energy). Especially Pt and Pt-Ru alloys have been used for fast evolution of $H_2$ because of their high electrocatalytic effects and low overpotential values in acidic medium. On the other hand, the fast evolution of hydrogen on Pt and on Pt-alloys appears not be the best way to use these materials for some hydrogenation reactions i.e $CO_2$ reduction. Then, the fast hydrogen evolution impedes the adsorption of the species on the surface and causes a drop of the current efficiencies for reduction products. In contrast to the existing materials used for HER, we have attempted a controlled hydrogen evolution on a Pt-free electrode targeting $CO_2$ reduction on a Pt-free electrocatalyst.

For the preparation of the electrode, firstly carbon paper was activated in an acidic permanganate solution and then an activated carbon paper was immersed in an acidic solution containing 0.1 M aniline. After that ammonium peroxodisulphate (APS) solution added in aniline solution. In that
case, the aniline polymerize on the C-paper surface having an enormous electrical conductivity (ca. 5 S/cm). This modified electrode was investigated electrochemically to test the hydrogen evolution rate on its surface and the morphological properties of the modified electrode was characterized by SEM.

**Keywords**: Polyaniline, Modified electrode, Hydrogen evolution, Pt-free electrode

**General area of research**: Chemistry
Electrochemical determination of paracetamol in the presence of ascorbic acid and caffeine using an electrochemical treated pencil graphite electrode

Ozge Koyun1, Semih Gorduk1, Melih Besir Arvas1, Yucel Sahin1, and Ulvi Avciata1

1 Department of Chemistry, Faculty of Arts and Science, Yildiz Technical University, TR34210, Istanbul, Turkey
ozgekyn34@gmail.com, semih_grdk@hotmail.com, mbesirarvas@gmail.com, yucelsahin06@gmail.com, uavciata@gmail.com

Abstract

Paracetamol (acetaminophen) is widely used as an analgesics and antipyretics pharmaceutical active substance, and is safe for humans when used without the normal dose is exceeded [A. Afkhami, H. Khoshsafar, H. Bagheri, T. Madrakian, Sensors and Actuators B 203 (2014) 909–918]. An over dosage of PC causes to the accumulation of toxic metabolites, which may lead intense and sometimes pernicious hepatotoxicity and nephrotoxicity. Drugs consisting of PC and CF combination are mostly used as pain relief, central nervous system stimulant and an analgesic agent. An over dosage of these combination drugs leads to vomiting, irregular heartbeat, nausea, cardiovascular diseases and cancer [M. Mazer, J. Perrone, Acetaminophen-induced nephrotoxicity: Pathophysiology, clinical manifestations, and management, J. Med. Toxicol. 4(1) (2008) 2–6]. Therefore, their determination and quantification are much important in analgesic formulations and also can give beneficial guidance to human health and life. The widespread use of PC with AA and CF require fast, simple, selective and sensitive methods to be developed for their determination in used for their in pharmaceutical samples. Many analytical techniques have been described the determination of PC, AA and CF, including spectrophotometry, high-performance liquid chromatography, and electrochemical methods [P. Koblova, H. Sklenarova, I. Brabcova, P. Solich, Anal. Methods 4 (2012) 1588–1591], [A. Bozdogan, A. M. Acar, G. K. Kunt, Simultaneous determination of acetaminophen and caffeine in tablet preparations by partial least-squares multivariate spectrophotometric calibration, Talanta 39(8) (1992) 977–979], [M. Blanco and M. Alcalá, Simultaneous quantitation of five active principles in a pharmaceutical preparation: Development and validation of a near infrared spectroscopic
method, Eur. J. Pharm. Sci. 27 (2006) 280–286]. In this work, we prepared a reliable, low cost, disposable and selective method based on CV using an electrochemically treated pencil graphite electrodes that first time in the literature for the determination of paracetamol in the presence of ascorbic acid and caffeine. In addition, it is successful to detect PC in real samples with satisfactory results. This modified electrode may be further applied in the related fields.

**Keywords** : Pharmaceutical analysis, Paracetamol, Ascorbic acid, Caffeine

**General area of research** : Chemistry / Electrochemistry
ID–ICFAS2016: 1226

Investigation of hydrogen production in presence of nickel ions from magnesium waste

CISEM OZ¹, BILGE COSKUNER FILIZ², and AYSEL KANTURK FIGEN³

¹Department of Chemical Engineering, Yildiz Technical University, Istanbul, Turkey, cisemozz@gmail.com
²Department of Chemical Engineering, Yildiz Technical University, Istanbul, Turkey, bilgecoskuner@gmail.com
³Department of Chemical Engineering, Yildiz Technical University, Istanbul, Turkey, ayselkanturk@gmail.com

Abstract

Magnesium is one of the lightest element with symbol Mg and 12 atomic number. It is a shiny and proper material for alloying and energy applications. The magnesium has higher electro positivity value that cause to easily react with water to form hydrogen. By the way, increasing the reaction sites and improving the mechanical properties of magnesium composites mechanical alloying of by ball milling have been suggested to provide efficient energy applications.

In this study, hydrogen production in presence of nickel chloride solution from magnesium waste was investigated. To changing the surface characteristics of the waste material, we milled it wastes by ball milling procedure with 30 hours 300 rpm. Also we did modification by addition of organic solvent (tetra hydro furan) and inorganic oxide breaker agent (NaCl, 10 wt.%) to see the effects on the hydrogen production performance of system. The water displacement method was used to measure generated hydrogen quantity versus time. Despite the hydrogen production did not seem in pure water, nickel ions containing solution was achieved the hydrogen production efficiently from magnesium waste.

Keywords : Hydrogen, Production, Mg waste, Nickel

General area of research : Chemistry
Synthesis of new silicon phthalocyanine and spectral properties

Goknur Yasa Atmaca1, Fikriye Tuncel Elmali2, and Ali Erdogmus3

1 Department of Chemistry, Yildiz Technical University, 34210, Esenler, Istanbul, Turkey, goknuryasa@gmail.com
2 Department of Chemistry, Yildiz Technical University, 34210, Esenler, Istanbul, Turkey, ftuncel@yildiz.edu.tr
3 Department of Chemistry, Yildiz Technical University, 34210, Esenler, Istanbul, Turkey, aerdog@yildiz.edu.tr

Abstract

Phthalocyanines (Pcs) are important dyes used in the medicinal field as photosensitizers for photodynamic therapy (PDT) of cancer treatment [C. M. Allen, W. M. Sharman, J. E. van Lier, J. Porphyrins Phthalocyanines 5 (2001) 161–169]. The photophysical properties of Pc dyes are strongly influenced by nature of the central metal ion. Applications of phthalocyanines are restricted owing to their insolubility in common solvents and water. The solubility of phthalocyanines can be improved by introducing different kinds of bulky substituents, such as crown ethers, alkyl, alkoxy and alkylthio and the donor atoms such as N and O within the substituents at the periphery of the phthalocyanines [G. Y. Atmaca, C. Dizman, T. Eren, A. Erdogmus, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 137 (2015) 244–249].

In this study; we want to combine the above–mentioned properties for more effective photodynamic agent. Thus, the new axially substituted silicon (IV) phthalocyanine was synthesized by treating silicon phthalocyanine dichloride SiPc(Cl)2 with 4- hydroxybenzylideneimino-1,10-phenanthroline ruthenium bipyridine complex. The compound was studied in different solutions (DMSO, DMF, THF) and characterized by mass spectrometry, UV-Vis, FT-IR, 1H NMR spectroscopy. Photophysical and photochemical properties of the compound will be studied.
Keywords: Phthalocyanine, Silicon, Photochemistry, Photophysical

General area of research: Chemistry

Synthetic route of the new silicon phthalocyanine
Adsorption kinetics of the removal of dipyrone from aqueous solutions

Elif Caliskan Salihi

Department of Basic Pharmaceutical Sciences, Faculty of Pharmacy, Marmara University, 34668, Istanbul, Turkey, caliskanelif@gmail.com

Abstract

Adsorption method is an attractive alternative for the treatment of wastewaters because of its low cost, low energy consumption, flexibility, simplicity in operation and insensitivity to toxic pollutants. Different absorbents have been used for removal of pollutants from water; activated carbons are among the most effective absorbents because of their excellent adsorption capacity for organic targets. Activated carbons are widely used as absorbents in technologies related to pollution abatement, pharmaceutical and food industries due to their highly porous structure and large adsorption capacity. There are several studies on the adsorption of organic targets from aqueous solutions on activated carbon, but studies on adsorption of drugs to carbon absorbents are still very limited in the literature [E. S. Caliskan, E. Aydin, Adsorptive characteristics of isoniazid on powdered activated carbon: π–π dispersion interactions at the solid–solution interface, Journal of Dispersion Science and Technology, DOI: 10.1080/01932691.2016.1173562].

In this context, the objective of this study is to investigate the adsorption kinetics of dipyrone (Figure 1) on commercial activated carbon from aqueous solutions. Adsorption kinetics data were modeled using the Lagergren first order and the Pseudo–second order kinetic equations. Interlayer diffusion graphics were also plotted. Data obtained from the kinetic studies obeyed the Pseudo-second order model better than the Lagergren first order model. Analysis of the intraparticle diffusion graphs showed that two types of mechanism are operating in the adsorption process which are the boundary layer
effect and the intraparticle diffusion.

![Chemical structure of dipyrone](image)

**Figure 1. Chemical structure of dipyrone**

**Keywords**: Adsorption, Kinetics, Activated carbon, Intraparticle diffusion

**General area of research**: Chemistry
Synthesis and physicochemical characterization of zinc phthalocyanine by inverse gas chromatography

Sibel Eken Korkut¹, Ozlem Yazici¹, and Fatih Cakar¹

¹Department of Chemistry, Yildiz Technical University, Davutpaşa Campus, Esenler, Istanbul, 34220, Turkey, sibeleken@gmail.com, yaziciozlem@gmail.com, ffatihcc@yahoo.com

Abstract

Phthalocyanines (PCs) are planar aromatic macrocycles consisting of four isoindole units presenting an 18 \( \pi \)-electron aromatic cloud delocalized over an arrangement of alternated carbon and nitrogen atoms. Their bright colors, conductivity, high chemical and thermal stability, architectural flexibility, diverse coordination properties and good spectroscopic characteristic have made them very desirable for a various potential applicability in many fields of science and technology [C. C. Leznoff, A. B. F. Lever, Phthalocyanines, Properties and Applications, Volume 1, Wiley–VCH, New York, 1989].

Inverse gas chromatography (IGC) can be used in investigation of surface and solubility characteristics of solids. IGC is a simple, relatively fast method, with good accuracy, low cost and available equipment. In numerous studies it was widely used to obtain valuable thermodynamic information for physicochemical characterization of materials such as pharmaceuticals, polymers, copolymers, inorganic compounds, liquid crystals etc. [S. Mohammadi–Jam, K. E. Waters, Inverse gas chromatography applications: A review, Adv. Colloid Interface Sci. 212 (2014) 21–44].

In this study, the zinc phthalocyanine (ZnPc) were synthesized and characterized. Its interaction with different types of solvents was investigated by IGC. The retention diagrams of some solvents on ZnPc were plotted at...
temperatures between 413.2 and 463.2 K.

**Keywords**: Inverse gas chromatography, Phthalocyanine, Thermodynamic interactions

**General area of research**: Chemistry
One–pot synthesis of various pyrimidine derivatives using Yb(OTf)$_3$ catalyst under ultrasonic technique

Kadir Turhan$^1$ and Zuhal Turgut$^2$

$^1$Department of Chemistry, Faculty of Arts and Science, Yildiz Technical University, Istanbul, 34210, Turkey, turhankadir@yahoo.com

$^2$Department of Chemistry, Faculty of Arts and Science, Yildiz Technical University, Istanbul, 34210, Turkey, zturgut61@yahoo.com

Abstract

Uracil and its derivatives, such as pyrido[2,3-d]pyrimidines have received considerable attention over the past years because of their several biological activities such as, antibacterial, antiallergic, antimicrobial, tyrosine kinase, anti–inflammatory, analgesic and antifungal.

Multi component reactions (MCRs) become powerful tools in organic reactions to form carbon–heteroatom bond in one–pot procedures. The organic chemists are designing new synthetic methods in organic synthesis that they are environmentally and economically useful in compare with multi-step reactions which produce large amounts of waste after each step.

Sonochemistry is the application of ultrasound (US) to chemical reactions and processes. This technique is able to activate many organic reactions due to cavitation collapse.

During the lst two decades, rare earth metal triflates are often employed as catalysts in organic synthesis, due to their low toxicity, affordability, stability. Yb(OTf)$_3$ has already been used as Lewis acid catalysts in ring closure reactions.

A simple and clean one–pot method for the preparation of 7-amino-5-(aryl)-1,3-dimethyl-1H-pyrido[2,3-d]pyrimidine-2,4-dione derivatives using 6-amino-1,3-dimethyluracil, various aromatic aldehydes and malononitrile in the presence of Yb(OTf)$_3$ under US in this study. Pyridopyrimidine deriv-
tives were obtained in good yields.

\[
\text{RCHO} + \text{NC} = \text{CN} + \text{H}_2\text{N} + \text{CH}_3 \xrightarrow{M(\text{OTf})_3} \text{N} = \text{CH}_3
\]

**Keywords**: Pyridopyrimidine, Triflate, Ultrasonic irradiation, One–pot reaction

**General area of research**: Chemistry
Synthesis and characterization of a new Fluoro-Quinoline substituted zinc phthalocyanines

Bahadir Keskin and Melike Arslan

1Department of Chemistry, Yildiz Technical University, 34210, Istanbul, Turkey, bahadirkeskin@gmail.com
2Department of Chemistry, Yildiz Technical University, 34210, Istanbul, Turkey, melikearslan92@gmail.com

Abstract

Phthalocyanines (Pcs) are considered as synthetic porphyrin analogues and emerge as attractive molecular building blocks due to a variety of their characteristic properties and flexible synthesis. Introducing additional functional groups onto the phthalocyanine skeleton has been effectively employed towards extending the functionalities of tetrapyrrole chromophores [J. Kan, C. Chen, K. Wang, Y. Chen, J. Jiang, Dyes Pigm. 105 (2014) 63–65]. Pcs have been of great scientific interest in industries for their wide-spread applications in the fields of coloring material–pigment, energy conversion, electrophotography, gas sensors, liquid crystals, infrared dyes for laser technology, optical data storage [D. Akyüz, B. Keskin, U. Sahinturk, A. Koca, Applied Cat. B–Environ. 188 (217) (2016) 226].

We described herein, the synthesis and characterization of novel Zn(II) phthalocyanine derivatives which contain a 8-fluoroquinoline unit on each benzo group and tetra-substituted phthalocyanine was synthesis. The new ZnPc structure was characterized by FT–IR, TLC, UV–Vis absorption, $^1$H NMR. This study was supported by Scientific Research Projects Unit of Yildiz Technical University (P.No: 2016-01-02-GEP01).
Abstract: Phthalocyanines (Pcs) are considered as synthetic porphyrin analogues and emerge as attractive molecular building blocks due to a variety of their characteristic properties and flexible synthesis. Introducing additional functional groups onto the phthalocyanine skeleton has been effectively employed towards extending the functionalities of tetrapyrrole chromophores [1].

Pcs have been of great scientific interest in industries for their wide-spread applications in the fields of coloring material-pigment, energy conversion, electrophotography, gas sensors, liquid crystals, infrared dyes for laser technology, optical data storage [2].

We described herein, the synthesis and characterization of novel Zn(II) phthalocyanine derivatives which contain a 8-fluoroquinoline unit on each benzo group and tetra-substituted phthalocyanine was synthesis. The new ZnPc structure was characterized by FT-IR, TLC, UV-Vis absorption, 1H NMR. This study was supported by Scientific Research Projects Unit of Yildiz Technical University (P.No: 2016-01-02-GEP01).

Keywords: Phthalocyanine, Quinoline, Fluorine, Zinc

General area of research: Chemistry
PET/MRI multi-modality imaging with all aspects: An evaluation study

Handan Tanyildizi¹, Muhammad Abuqebitah², Iffet Cavdar³, and Mustafa Demir⁴

¹Medical Imaging Techniques Programme, Vocational School of Health Services, Istanbul Kemerburgaz University, Istanbul, Turkey, handan.tanyildizi@kemerburgaz.edu.tr
²Nuclear Medicine Department, Cerrahpasa Medical Faculty, Istanbul University, Istanbul, Turkey, qbeta95@hotmail.com
³Department of Physics, Science Faculty, Istanbul University, Istanbul, Turkey, icavdar@istanbul.edu.tr
⁴Nuclear Medicine Department, Cerrahpasa Medical Faculty, Istanbul University, Istanbul, Turkey, demirm@istanbul.edu.tr

Abstract

The new generation multi-modal imaging techniques are well-established in nuclear medicine clinical practice. Positron Emission Tomography (PET) installations are contained almost exclusively of combined PET and Computed Tomography (CT) scanners rather than only PET systems. PET and Magnetic Resonance Imaging (MRI) shows a promising hybrid imaging modality with several potential clinical applications. Although, PET/CT has certain remarkable shortcomings, including the inability to perform simultaneous data acquisition and the notable radiation dose to the patient contributed by CT. Compared with CT, MRI offers better contrast among soft tissues as well as functional-imaging capabilities. Therefore, the combination of PET with MRI provides many advantages which achieve beyond combining functional PET images with structural MRI images. Many technical challenges, including possible interference between these modalities, have to be solved when combining PET and MRI and various approaches have been adapted to resolving these issues. In this study, we aimed to present an overview about advantages and disadvantages of PET/MRI and to evaluate
quantification of PET/MRI images. The combination of PET and MRI is a promising tool in pre-clinical research and will certainly progress to clinical application.

**Keywords**: PET/CT, PET/MRI, Multi-modal imaging

**General area of research**: Physics
Formulation and optimization of a growth medium containing chicken intestine hydrolyzate for *Lactobacillus plantarum* BH14

Messaouda Boukhemis¹ and Kelthoum Ahmed Gaid²

¹Department of Biochemistry, Faculty of Sciences, University Badji Mokhtar–Annaba, P.O. 12, Annaba, 23000, Algeria, mesboukhemis@yahoo.fr

²Department of Biochemistry, Faculty of Sciences, University Badji Mokhtar–Annaba, P.O. 12, Annaba, 23000, Algeria, agkelthoum@gmail.com

Abstract

Chicken intestine, which is an abundant and not exploited animal by product, was valorized to formulate a growth medium for a strain of *Lactobacillus plantarum*. For this purpose, chicken intestine hydrolyzate (CIH) was extracted by an autolytic hydrolysis and used as a basis of the medium. To maximize the strain growth, medium composition and physicochemical parameters were optimized using statistical designs. Plackett and Burman Design (PBD) was used to study the effect of 11 factors on the strain growth: Glucose, yeast extract, ammonium citrate, K₂HPO₄, MgSO₄, MnSO₄, Tween 80, pH, agitation and two dummy. Factors showing significant effects were optimized using Central Composite Design (CCD). As a result, the optimized medium supporting the best growth of *L. plantarum* was found to be composed of 27.69g/L of glucose and 0.013 g/L of MgSO₄. On this medium, the strain reached a growth potential of 7.5 (optical density value at 600 nm) which is 6.83% higher than obtained on the standard medium MRS. Thus, chicken intestine based medium could constitute a low cost alternative to MRS medium to cultivate *L. plantarum* and probably other lactic acid bacteria strain.

Keywords: Chicken intestine, Autolysis, Growth medium, Lactobacillus plantarum BH14, Statistical designs

General area of research: Biology
Inhibition of spoilage yeasts by *Williopsis saturnus* var. *saturnus* (in vitro)

Muhammet Arici¹ and Cagil Turkay²

¹Department of Food Engineering, Faculty of Chemical and Metallurgical Engineering, Yildiz Technical University, 34210, Istanbul, Turkey, muarici@yildiz.edu.tr

Abstract

Some kind of yeast strains secrete protein based extracellular toxin into the medium known as ‘killer toxin’. Under some available and definite conditions, these killer toxins are lethal to some sensitive yeast strains; however, they do not have a fatal effect against other types of microorganisms. In addition, killer toxins are not dangerous or lethal to humans because they affect only certain cell wall components and interact with cell wall elements that harbor specific receptors.

The application of killer yeast in food industry has been the subject of many researchers and the result of their studies give insight about killer yeasts use in biotechnology, biomedicine, fermentation process and as a preserver. Some studies also show killer yeast applications in environmental areas. The research mostly focused on general information about killer yeasts, killer toxin production, secretion mechanism and industrial application; using methods of killer toxins in food industry and emphasized effect of killer toxins of *Williopsis saturnus* var. *saturnus* against to the yeasts which causes spoilage on the cheese and other products. For this purpose time depended pH and optical densitometry analysis were done at the grape juice trials. As a result, *in vitro* inhibition effect of the killer yeasts against some spoilage yeasts was proved positively in this study; on the other hand, any specific positive effect related killer yeasts was attained food sample trials.

Keywords: Killer yeast, *Williopsis saturnus*, Spoilage Yeast, Inhibition

General area of research: Biology
ID–ICFAS2016: 1166

The effect of juglone on contamination in plant tissue culture

SEYDA KAYA1, SEMIHA ERISEN2, AND ISMAIL KOCAÇALISKAN3

1Department of Molecular Biology and Genetics, Faculty of Arts and Sciences, Yıldız Technical University, Istanbul, Turkey, sydkya@gmail.com
2Department of Molecular Biology and Genetics, Faculty of Arts and Sciences, Yıldız Technical University, Istanbul, Turkey, syerisen@yahoo.com
3Department of Molecular Biology and Genetics, Faculty of Arts and Sciences, Yıldız Technical University, Istanbul, Turkey, ikocacaliskan@gmail.com

Abstract

Contamination of explants by bacteria and fungi can be a major obstacle in the establishment of plant tissue cultures. So different chemical agents have been used to eliminate fungal and bacterial contamination in tissue cultures. Juglone (5-hydroxy-1,4-naphthoquinone) is an allelochemical accountable for walnut allelopathy. It can be isolated from bark, peel, fruits and leaves of walnut tree (Juglans sp.) and exhibits significant antimicrobial, antitumor, antihypertensive and enzyme inhibition activities.

Aseptic seedling is one of the useful source for obtaining sterile explants. This study was aimed to the effect of juglone on elimination of contamination and in vitro germination of Carthamus tinctorius (safflower) to obtain aseptic seedling. Three safflower cultivars (Ayaz, Balci, Linans) seeds that exposed to high amounts of contamination in in vitro germination were used. At the beginning, the seeds were washed under running tap water. After the seeds were continuously rinsed in 70% (h/h) commercial bleach with 1-2 drops of Tween-20 for 30 minutes followed by 3 times rinses with sterile distilled water. Sterilized seeds were transferred to MS medium alone or in combination with juglone (250 or 500 µg/ml) to germination.

According the results, adding juglone in germination medium was effective on elimination of contamination and higher concentration of juglone caused an decrease in contamination frequency. In juglone free medium 47%, 50% and 97% contamination frequencies were observed in Balci, Ayaz and Linas, respectively. Whereas In Balci, no contamination was observed at
500 µg/ml juglone and contamination frequencies were 10% and 37% at this concentration in Ayaz and Linas, respectively. Generally, juglone is inhibit seed germination and seedling growth. However, juglone was not inhibited germination of safflower seeds compared with juglone free medium. On the other hands juglone was improved seedling growth.

**Keywords:** Juglone, Safflower, Fungal, Contamination

**General area of research:** Biology
Change in some phytohormone levels in Arabidopsis leaves in response to switch in inorganic nitrogen source

Wissem Mhiri\textsuperscript{1} and Turgay Cakmak\textsuperscript{2}

\textsuperscript{1}Department of Chemistry, Yildiz Technical University, Istanbul, Turkey, mh.wissem@gmail.com
\textsuperscript{2}Department of Molecular Biology, Istanbul Medeniyet University, Istanbul, Turkey, turgay.cakmak@medeniyet.edu.tr

Abstract

Light, water and mineral nutrients are three important component of plant life. Amongst mineral nutrients, Nitrogen is of vital importance as it is involved in several metabolic pathways and for most cases nitrogen itself is a limiting factor for growth of a plant. In this study, we followed time-dependent hormonal change in the leaves of Arabidopsis thaliana Col-0 as a response to a change in inorganic nitrogen source and concentration. A.thaliana seeds were surface sterilised, grown hydroponically in Somerville and Ogren growth solution, when the buds become visible, plants were transferred on medium with 0.2, 1 or 5mM concentration of ammonium sulfate (HN4)2SO4, potassium nitrate (KNO3), or Ammonium nitrate (NH4NO3) as nitrogen source, and a group of plant were grown under nitrogen deprived condition as negative control. Leaves were harvested on 0, 1st, 3rd and 5th day of nitrogen switch. Change in level of Gibberellic acid (GA), Abscisic Acid (ABA), Indole acidic acid (IAA), Zeatin, and Salycilic acid (SA) in the leaves of A. thaliana was determined by Liquid Chromatography-Mass Spectrometry (LC-MS) analysis. Gibberellic acid and ABA levels increased in response to nitrogen deprivation. Level of IAA showed a time-dependend increase in 0.2mM-KNO3 group while it was opposite when nitrogen is supplied as NH4SO4 at 0.2mM concentration. Zeatin level increased in response to high NH4SO4 and NH4NO3 levels. Lastly SA level increased in response to nitrogen deprivation, and ammonium nutrition. Results show that growth
hormones are actively involved in cellular regulation of concentration-dependend nitrogen switch.

**Keywords**: Arabidopsis thaliana, Nitrogen, nitrate, Ammonium, Ammonium–nitrate, Phytohormone

**General area of research**: Chemistry, Biology
ID–ICFAS2016: 1222

Biological property of Fritillaria imperialis extract

Ali Aydin1, Emine Dede2, Mahfuz Elmastas3, and Saban Tekin4

1Department of Biology, Faculty of Art and Science, Gaziosmanpasa University, 60240, Tokat, Turkey, aliaydin.bio@gmail.com
2Department of Chemistry, Faculty of Art and Science, Gaziosmanpasa University, 60240, Tokat, Turkey
3Department of Chemistry, Faculty of Art and Science, Gaziosmanpasa University, 60240, Tokat, Turkey
4Department of Biology, Faculty of Art and Science, Gaziosmanpasa University, 60240, Tokat, Turkey

Abstract

This work describes the pharmacological activity of extracts of Fritillaria imperialis that belongs to Liliaceae family. Its tendrilled bulbs are consumed fresh or prepared in powdered form and used as a home remedy for cough and phlegm, high fever, hemorrhage, lack of milk, treatment of abscesses, asthma, rheumatism, and eye disease. Herein, we investigated the antiproliferative, cytotoxic effects and antibacterial activities of Fritillaria imperialis extracts on HeLa (Human Cervix Carcinoma), HT29 (Human Colorectal Adenocarcinoma), C6 (Rat Brain Tumor Cells), and Vero (African Green Monkey Kidney) cell lines. The in vitro antiproliferative effects and cell toxicity of Fritillaria imperialis extracts were investigated through MTT and LDH measurement techniques, and its antimicrobial effects were studied with MIC and disc–zone test. The extracts of Fritillaria imperialis have been shown to exhibit poor antiproliferative effects and antibacterial activities on some cancer cell lines and bacteria, respectively, at even high concentration. This data suggest that Fritillaria imperialis extracts are low cytotoxic to cancer cell lines and Staphylococcus aureus (ATCC 25923) and Escherichia coli (ATCC 25922). Our results indicate that clinic consideration of Fritillaria imperialis extracts for the treatment of malignant and bacterial disease needs to be re-evaluated due to its different extraction and isolation methods.

Keywords : Fritillaria imperialis, Anticancer effect, HeLa, HT29, C6, Vero

General area of research : Biology
Analyzing of certain conserved miRNA in *Olea europaea*

**Sultan Cansu Gonenc**<sup>1</sup>, Zehra Ulu<sup>1</sup>, Hatice Nur Aydin<sup>1</sup>, Salih Ulu<sup>1</sup>, Busra Yirmibes<sup>1</sup>, and Nehir Ozdemir Ozgenturk<sup>1</sup>

<sup>1</sup>Department of Molecular Biology and Genetics, Faculty of Arts and Sciences, Yildiz Technical University, Esenler, Istanbul, Turkey.
cansu.gonenc@kemerburgaz.edu.tr

**Abstract**

Olive (*Olea europaea*), oleaceae (*Oleaceae*) is a species of fruit eaten in the Mediterranean climate of the family. For better understanding of the molecular mechanism olives it should be reviewed to regulation of gene expression. In this study, we aimed to show available conserved miRNAs in olive plants. miRNAs (21–23 nucleotides long) act as post-transcriptional regulators in the regulation of gene expression. These plants and animals after transcription (post-transcriptional) they function level, and perform the functions of two ways: By inhibiting translation of the gene or mRNA degradation regulate gene expression induced by. miRNAs are well conserved in both plants and animals, and are thought to be a vital and evolutionarily ancient component of gene regulation.

The aim of this study is to analyze some protected miRNAs in leaf of *Olea europaea* by using RT–PCR and Real–Time PCR.

Previously EST library established by the G–20 line of olive (*Olea europaea*) young leaf samples were collected. Total RNAs including miRNAs were isolated by using miRCURY™ RNA Isolation Kit–Cell and Plant. The presence of RNAs were determined by MOPS gel electrophoresis. Extracted total RNA were quantified by Nanodrop® ND–100 spectrophotometer (Nanodrop Technologies, USA).

Reverse transcription (RT) of miRNAs was done by miRNA 1st–Strand cDNA Synthesis Kit (Agilent Technologies, Inc.). Then, using 6 miRNA specific primer pairs Polymerase Chain Reaction (PCR) was performed. Real–Time PCR amplification was performed by using miRNA QPCR Master Mix on an AriaMX Real–Time PCR System (Agilent Technologies, Inc.).

miR–159, miR–160, miR–171, miR–396, miR–2919 and miR–8123 which are protected in plants were amplified in leaf tissues of Olea europaea by PCR and real–time PCR. In this study by using universal reverse primers miRNA presence could be detected with real–time PCR, without the need...
for agarose gel electrophoresis. Thus preserved in olive detection of miRNAs were provided with more reliable data.

**Keywords** : miRNA, *Olea europaea*, Olive, RT–PCR, cDNA, Real–Time PCR

**General area of research** : Biology