BUKU ABSTRAK
PROJEK SARJANA MUDA
JABATAN SAINS MATEMATIK

SESI 2015/2016

FAKULTI SAINS
UNIVERSITI TEKNOLOGI MALAYSIA

31 Mei 2016 (Selasa)
Makmal Komputer I
Bilik Mesyuarat dan Persembahan
Makmal Komputer III

1 Jun 2015 (Rabu)
Makmal Komputer I
Bilik Mesyuarat dan Persembahan
Makmal Komputer III

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ISI KANDUNGAN   **MUKA SURAT**

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FOREWORD BY
DEAN, FACULTY OF SCIENCE,
UNIVERSITI TEKNOLOGI MALAYSIA

Assalammualaikum wrm. wbt. and Salam Sejahtera,

Alhamdulillah, our greatest gratitude to Allah All Mighty for His Blessings that the Undergraduate Research Symposium or Simposium Projek Sarjana Muda (PSM) , 2015/2016 edition will be conducted. A warm applause and heartiest congratulations to all 4th Year students who will be presenting, to the committee members for successfully organizing this annual event and last but not least to all academic and technical staffs of the Faculty of Science who have tirelessly work to ensure the success of this Simposium, and above all to ensure the students' success through their endless commitment in supervising and providing technical support.

The Simposium PSM is a platform for 4th Year students in the Faculty to showcase their research findings, and provides an avenue to enhance their communication skills, both oral and written, while PSM itself has throughout the years proven to be the means by which young scientists are encouraged and nurtured through positive research culture and academic excellence.

It is the Facullty's wish that PSM and the Simposium will continue to flourish and maintain to be one of the Faculty's means of acquiring quality research and publications in years to come. Wassalam wrm wbh and warmest wishes.

Thank you.

PROFESSOR DR NORSARAHAIDA SAIDINA AMIN
Dean, Faculty of Science

Kata Aluan

Ketua Jabatan Sains Matematik

Assalamualaikum dan salam sejahtera.

Alhamdulillah dan syukur kepada Allah yang telah memberikan kurniaanNya sehingga dapat saya menyampaikan kata-kata aluan di dalam buku cenderamata Projek Sarjana Muda (PSM) Jabatan Matematik, Fakulti Sains bagi Sesi 2015/2016.

PSM merupakan salah satu aktiviti terpenting dalam jadual pengajian ijazah sarjana muda sains matematik/matematik industri di Jabatan Sains Matematik, Fakulti Sains. Secara khusus PSM bertujuan melatih pelajar tentang kaedah menjalankan penyelidikan dan pengurusan maklumat berkaitan bidang sains matematik dan aplikasinya. Latihan ini dilaksanakan dengan menggilap pelbagai kemahiran generik seperti berkomunikasi dan berhujah, penulisan akademik, pendidikan sepanjang hayat, dan lain-lain. Selain didedahkan dengan pengalaman berharga ini, pelajar juga memperoleh pengalaman tidak ternilai menjalankan penyelidikan di bawah seliaan pensyarah-pensyarah Jabatan Sains Matematik, Fakulti Sains yang hebat. Hubungan dua hala pelajar dan penyelia yang berkesan ini merupakan salah satu faktor berpengaruh bagi penghasilan sebuah PSM bermutu dan dirujuki. Saya sangat berharap aktiviti PSM ini dapat melengkapkan pelajar-pelajar untuk berani dan yakin menghadapi sama ada alam pekerjaan mahupun pengajian lanjutan di masa depan.

Akhir kata saya mengucapkan tahniah kepada semua pelajar yang membentangkan projeknya pada Simposium kali ini. Setinggi-tinggi terima kasih dan sekalung penghargaan juga saya ucapkan kepada pengerusi serta ahli-ahli Jawantankuasa PSM, Jabatan Sains Matematik, Fakulti Sains yang telah berusaha dengan gigih menjalankan tugas dan tanggungjawab meningkatkan kualiti dan pengurusan PSM di Jabatan.

Sekian, terima kasih.

PM Dr Rohanin Ahmad
Ketua Jabatan Sains Matematik
Fakulti Sains.

Kata Aluan
Pengerusi Projek Sarjana Muda
Jabatan Sains Matematik

Assalamualaikum dan selamat sejahtera.

Alhamdulillah dan terima kasih kerana memberi peluang kepada saya untuk memberikan kata-kata aluan di dalam buku cenderamata Simposium Projek Sarjana Muda, Jabatan Sains Matematik, Fakulti Sains bagi Sesi 2015/2016.

Simposium yang telah dilaksanakan sejak Sesi 1990/91 ini merupakan kemuncak aktiviti Projek Sarjana Muda, Jabatan Sains Matematik. Di dalam simposium ini diharapkan para pelajar dapat menyampaikan segala kajian yang telah dilakukan sepanjang dua semester dengan jelas dan lancar sebagai pengalaman awal sebelum mereka memasuki pasaran kerja.

Saya mengucapkan syabas dan terima kasih kepada Ahli Jawatankuasa, Staf Jabatan (akademik dan sokongan), pelajar dan semua pihak yang terlibat secara langsung atau tidak langsung dalam merancang dan melaksanakan simposium ini. Semoga segala usaha murni kita untuk membentuk generasi yang cemerlang, gemilang dan terbilang akan sentiasa diredhai Allah.

Sekian, terima kasih

Tn. Hj. Zakaria Dollah
Pengerusi
Projek Sarjana Muda
Jabatan Sains Matematik
Fakulti Sains
Sesi 2014/2015

JADUAL SIMPOSIUM

MAKMAL KOMPUTER I
31 MEI 2016 (SELASA)

8.30 – 8.50 pagi	Pelajar : Norhakim B. Ramli Penyelia : Dr. Shariffah Suhaila S. Jamaluddin PD : PM. Dr. Fadhilah Yusof Pengerusi : Dr. Haliza Abd Rahman
8.55 – 9.15 pagi	Pelajar : Wan Muhammad Afiq B. Wan Muhamad Penyelia : PM. Dr. Robiah Adnan PD : Dr. Haliza Abd Rahman Pengerusi : PM. Dr. Fadhilah Yusof
9.20 – 9.40 pagi	Pelajar : Nur Ibrahima Bt. Shamsuri Penyelia : En. Muhammad Fauzee Hamdan PD : Dr. Shariffah Suhaila S. Jamaluddin Pengerusi : Dr. Haliza Abd Rahman
9.45 – 10.05 pagi	Pelajar : Nurul Syazwani Bt. Mohammad Penyelia : Dr. Norazlina Ismail PD : Dr. Shariffah Suhaila S. Jamaluddin Pengerusi : Pn. Noraslinda Mohd Ismail
REHAT	
10.35 – 10.55 pagi	Pelajar : Darma Bt. Abdul Mida Penyelia : PM. Dr. Maizah Hura Ahmad PD : Pn. Noraslinda Mohd Ismail Pengerusi : Dr. Shariffah Suhaila S. Jamaluddin
11.00 – 11.20 pagi	Pelajar : Martini Bt. Yahya Penyelia : Dr. Rashidah Ahmad PD : PM. Dr. Rohanin Ahmad Pengerusi : Pn. Noraslinda Mohd Ismail
11.25 – 11.45 pagi	Pelajar : Nurziyana Bt. Hairudin Penyelia : Prof. Dr. Zainal Abdul Aziz PD : Dr. Anati Ali Pengerusi : Prof. Dr. Tahir Ahmad
11.50 – 12.10 tgh	Pelajar : Nur Alya Bt. Aminuddin Penyelia : Dr. Amidora Idris PD : Prof. Dr. Tahir Ahmad Pengerusi : Dr. Anati Ali
REHAT	
2.00 – 2.20 ptg	Pelajar : Nurfarahida Azwani Bt. Mohd Fazllah Penyelia : Dr. Mohd Ariff Admon PD : Dr. Shazirawati Mohd Puzi Pengerusi : Dr. Anati Ali
2.25 – 2.45 ptg	Pelajar : Nor Hidayah Bt. Hasan Penyelia : Dr. Norhaiza Ahmad PD : En. Muhammad Fauzee Hamdan/ Dr Mohd Arif Pengerusi : Dr. Shazirawati Mohd Puzi
2.50 – 3.10 ptg	Pelajar : Siti Haszriena Bt. Taman Penyelia : PM. Dr. Khairil Anuar Arshad PD : Dr. Mohd Ariff Admon Pengerusi : Dr. Shazirawati Mohd Puzi

3.15 – 3.35 ptg	Pelajar : Aishahtul Rabiah Bt. Halim Penyelia : Dr. Anati Ali PD : Dr. Mohd Ariff Admon Pengerusi : PM. Dr. Ismail Mohamad
3.40 – 4.00 ptg	Pelajar : Nurfarhani Bt. Mustafa Penyelia : Dr. Nor Muhainiah Mohd Ali PD : Dr. Amidora Idris Pengerusi : Dr. Niki Anis Abd Karim
4.05 - 4.25 ptg	Pelajar : Nur Athirah Bt. Jaafar Penyelia : Dr. Nor Muhainiah Mohd Ali PD : Dr. Amidora Idris Pengerusi : Dr. Niki Anis Abd Karim

MAKMAL KOMPUTER III
31 MEI 2016 (SELASA)

8.30 – 8.50 pagi	Pelajar : Mohamad Shahiir B. Saidin Penyelia : Pn. Halijah Osman PD : En. Che Lokman Jaafar Pengerusi: Dr Amidora Idris
8.55 – 9.15 pagi	Pelajar : Nur Rabiatuladawiyah Bt. Zulkepli Penyelia : Dr. Shazirawati Mohd Puzi PD : En. Che Lokman Jaafar Pengerusi: Dr. Faridah Mustapha
9.20 – 9.40 pagi	Pelajar : Mohammad Ridhwan B. Reyaz Ahmad Penyelia : Dr. Fuaada Mohd Siam PD : Dr. Faridah Mustapha Pengerusi : En. Che Lokman Jaafar
9.45 – 10.05 pagi	Pelajar : Mohd Rashid B. Admon Penyelia : PM. Dr. Normah Maan PD : Dr. Faridah Mustapha Pengerusi : Dr. Yeak Su Hoe
REHAT	
10.35 – 10.55 pagi	Pelajar : Lee Wei Chee Penyelia : Pn. Wan Rukaida Wan Abdullah PD : En. Ibrahim Jais Pengerusi : Dr Yeak Su Hoe
11.00 – 11.20 pagi	Pelajar : Noor Hazwani Bt. Abdul Halim Penyelia : PM. Hazimah Abdul Hamid PD : PM. Dr. Khairil Anuar Arshad Pengerusi : En Ibrahim Jais
11.25 – 11.45 pagi	Pelajar : Ina Nur Hazirah Bt. Samudin Penyelia : PM. Dr. Ismail Mohamad PD : PM. Dr. Khairil Anuar Arshad Pengerusi : En Ibrahim Jais
11.50 – 12.10 tgh	Pelajar : Teoh Wei Kee Penyelia : Prof. Dr. Shaharudin Salleh PD : PM. Dr. Ali Hassan Mohd Murid Pengerusi : PM Hazimah Abd Hamid
REHAT	

2.00 – 2.20 ptg	Pelajar : Nurul Izzati Bt. Ghazali Penyelia : En. Che Lokman Jaafar PD : PM. Dr. Mukheta Isa Pengerusi : PM Hazimah Abd Hamid
2.25 – 2.45 ptg	Pelajar : Janietha Myrable Justin Penyelia : PM. Dr. K.K Viswanathan PD : PM. Dr. Mukheta Isa Pengerusi : PM Hazimah Abd Hamid
2.50 – 3.10 ptg	Pelajar : Nur Asyiqin Bt. Mohd Nasarruddin Penyelia : Dr. Zaiton Mat Isa PD : Pn. Halijah Osman Pengerusi : PM. Dr. Mukheta Isa
3.15 – 3.35 ptg	Pelajar : Siti Shahidah Bt. Mazlan Penyelia : En. Zakaria Dollah PD : Pn. Halijah Osman Pengerusi : Dr. Niki Anis Abd Karim
3.40 – 4.00 ptg	Pelajar : Syahirah Bt. Saupi Penyelia : Dr. Arifah Bahar PD : PM. Dr. Ismail Mohamad Pengerusi : Pn. Halijah Osman
4.05 – 4.25 ptg	Pelajar : Foo Weoi Ming Penyelia : PM. Dr. Fadhilah Yusof PD : PM. Dr. Ismail Mohamad Pengerusi : Dr Norhaiza Ahmad

BILIK MESYUARAT UTAMA
31 MEI 2016 (SELASA)

8.30 – 8.50 pagi	Pelajar : Nurrul Wahida Bt. Mohd Mustafa Penyelia : PM. Dr. Rohanin Ahmad PD : Dr. Farhana Johar Pengerusi : PM Hazimah Abd Hamid
8.55 – 9.15 pagi	Pelajar : Nurul Ain Bt. Alzafry Mohamed Alnassif Penyelia : Dr. Zaitul Marlizawati Zainuddin PD : Dr. Farhana Johar Pengerusi : En. Ismail Kamis
9.20 – 9.40 pagi	Pelajar : Nurul Ain Bt. Norazmi Penyelia : Wan Rohaizad Wan Ibrahim PD : En. Ismail Kamis Pengerusi : Dr. Farhana Johar
9.45 – 10.05 pagi	Pelajar : Mohamad Amirul Afif B. Mohamad Zani Penyelia : Dr. Nur Arina Bazilah Aziz PD : En. Ismail Kamis Pengerusi : Dr. Nor Muhainiah
REHAT	
10.35 – 10.55 pagi	Pelajar : Siti Norhidayah Bt. Mohd Nor Penyelia : Dr. Niki Anis Abd Karim PD : PM. Dr. Munira Ismail Pengerusi : Dr. Nor Muhainiah

11.00 – 11.20 pagi	Pelajar : Noorehan Bt. Yaacob Penyelia : En. Hamisan Rahmat PD : PM. Dr. Munira Ismail Pengerusi : PM. Dr. Norma Alias
11.25 – 11.45 pagi	Pelajar : Nur Farahin Abd Razak Penyelia : Dr. Yeak Su Hoe PD : PM. Dr. Norma Alias Pengerusi : PM. Dr. Munira Ismail
11.50 – 12.10 tgh	Pelajar : Nur Ain Farisha Penyelia : Dr. Yeak Su Hoe PD : PM. Dr. Norma Alias Pengerusi : Pn Halijah Osman
REHAT	
2.00 – 2.20 ptg	Pelajar : Nur Suhaila Bt. Adam Penyelia : Dr. Nur Arina Bazilah Aziz PD : En. Wan Rohaizad Wan Ibrahim Pengerusi : Dr Niki Anis Ab Karim
2.25 – 2.45 ptg	Pelajar : Muhammad Hadi B. Omar Penyelia : Dr. Shazirawati Mohd Puzi PD : En. Wan Rohaizad Wan Ibrahim Pengerusi : En. Zakaria Dollah
2.50 – 3.10 ptg	Pelajar : Nur Farahain Bt. Mohamad Penyelia : En. Hamisan Rahmat PD : En. Zakaria Dollah Pengerusi : En. Wan Rohaizad Wan Ibrahim
3.15 – 3.35 ptg	Pelajar : Suzarina Bt. Ahmad Sukri Penyelia : PM. Dr. Maslan Osman PD : En. Zakaria Dollah / En Hamisan Pengerusi : Dr. Zaitul Marlizawati Zainuddin
3.40 – 4.00 ptg	Pelajar : Siti Noor Atiqah Bt. Rasit Penyelia : Dr. Farhana Johar PD : Dr. Zaitul Marlizawati Zainuddin Pengerusi : Dr. Fong Wan Heng
4.05 - 4.25 ptg	Pelajar : Siti Nor Fazila Bt. Mohamad Penyelia : Dr. Rashidah Ahmad PD : Dr. Zaitul Marlizawati Zainuddin Pengerusi : Dr. Fong Wan Heng

MAKMAL KOMPUTER I
1 JUN 2016 (RABU)

8.30 – 8.50 pagi	Pelajar : Norsholeha Bt. Abdullah Penyelia : Dr. Haliza Abd Rahman PD : Dr. Ani Shabri Pengerusi : Dr. Norazlina Ismail
8.55 – 9.15 pagi	Pelajar : Muhammad Zillullah Mukaram Penyelia : PM. Dr. Fadhilah Yusof PD : Dr. Ani Shabri Pengerusi : Dr. Norazlina Ismail
9.20 – 9.40 pagi	Pelajar : Norfarahatika Bt. Shukor Penyelia : Dr. Haliza Abd Rahman PD : Dr. Norazlina Ismail Pengerusi : Dr. Ani Shabri
9.45 – 10.05 pagi	Pelajar : Nurul Fatin Bt. Ab. Azid Penyelia : Dr. Norazlina Ismail PD : Dr. Zarina Mohd Khalid Pengerusi : PM. Dr. Maizah Hura Ahmad
REHAT	
10.35 – 10.55 pagi	Pelajar : Eileen Lim Yi Xin Penyelia : Pn. Halijah Osman PD : PM. Dr. Maizah Hura Ahmad Pengerusi : Dr. Zarina Mohd Khalid
11.00 – 11.20 pagi	Pelajar : Tan Lay Huan Penyelia : Prof. Dr. Zuhaimy Ismail PD : PM. Dr. Maizah Hura Ahmad Pengerusi : Dr. Zarina Mohd Khalid
11.25 – 11.45 pagi	Pelajar : Nur Azlin Bt. Ahmad Penyelia : Dr. Zarina Mohd Khalid PD : Dr. Norhaiza Ahmad Pengerusi : Dr Amidora Idris
11.50 – 12.10 tgh	Pelajar : Siti Rohaida Bt. Kamarudin Penyelia : Dr. Zarina Mohd Khalid PD : Dr. Norhaiza Ahmad Pengerusi : Dr Amidora Idris
REHAT	
2.00 – 2.20 ptg	Pelajar : Muhamad Hanif B. Azmi Penyelia : Dr. Ani Shabri PD : Prof. Dr. Zuhaimy Ismail Pengerusi : PM. Dr. Robiah Adnan
2.25 – 2.45 ptg	Pelajar : Wong Hua Min Penyelia : Dr. Ani Shabri PD : Prof. Dr. Zuhaimy Ismail Pengerusi : PM. Dr. Robiah Adnan
2.50 – 3.10 ptg	Pelajar : Armaeni Bt. Agus Penyelia : Dr. Norhaiza Ahmad PD : PM. Dr. Robiah Adnan Pengerusi : Prof. Dr. Zuhaimy Ismail

| 3.15 – 3.35 ptg | Pelajar : Nuurul Afiqah Bt. Jasni
Penyelia : PM. Dr. Yudariah Mohamad Yusof
PD : Dr. Taufiq Khairi Ahmad Khairuddin
Pengerusi : Pn Halijah Osman |

MAKMAL KOMPUTER III
1 JUN 2016 (RABU)

8.30 – 8.50 pagi	Pelajar : Afiqah Bt. Abas Penyelia : En. Ibrahim Jais PD : Dr. Zuhaila Ismail Pengerusi: Pn. Halijah Osman
8.55 – 9.15 pagi	Pelajar : Siti Nor Rasyidah Hassan Penyelia : Pn. Wan Rukaida Wan Abdullah PD : Dr. Zuhaila Ismail Pengerusi: PM. Dr. Normah Maan
9.20 – 9.40 pagi	Pelajar : Izzah Afiqah Bt. Harun Penyelia : Dr. Faridah Mustapha PD : PM. Dr. Normah Maan Pengerusi: Dr. Zuhaila Ismail
9.45 – 10.05 pagi	Pelajar : Josephine Anak George Jimbun Penyelia : Dr. Faridah Mustapha PD : PM. Dr. Normah Maan Pengerusi: Dr. Taufiq Khairi Ahmad Khairuddin
REHAT	
10.35 – 10.55 pagi	Pelajar : Muhamad Hanis B. Mohd Nasir Penyelia : Dr. Fuaada Mohd Siam PD : PM. Hazimah Abdul Hamid Pengerusi : Dr. Taufiq Khairi Ahmad Khairuddin
11.00 – 11.20 pagi	Pelajar : Muhammad Aiman Rifdi B. Arifin Penyelia : Dr. Syarifah Zyurina Nordin PD : Dr. Fuaada Mohd Siam Pengerusi : PM. Dr. Yudariah Mohamad Yusof
11.25 – 11.45 pagi	Pelajar : Nadrah Bt. Ramli Penyelia : PM. Hazimah Abdul Hamid PD : Dr. Fuaada Mohd Siam Pengerusi : PM. Dr. K.K Viswanathan
11.50 – 12.10 tgh	Pelajar : Farhah Aqilah Bt. Abdul Aziz Penyelia : Prof. Dr. Mohd Nor Mohd PD : PM. Dr. K.K Viswanathan Pengerusi : Dr. Fuaada Mohd Siam
REHAT	
2.00 – 2.20 ptg	Pelajar : Nurul Huda Bt. Mohd Yusof Penyelia : En. Che Lokman Jaafar PD : Prof. Dr. Mohd Nor Mohamad Pengerusi : PM. Dr. Sharidan Shafie
2.25 – 2.45 ptg	Pelajar : Nadia Bt. Mohd Jaszari Penyelia : PM. Dr. Nor'aini Aris PD : PM. Dr. Shaharudin Salleh

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	Pengerusi : PM. Dr. Sharidan Shafie
2.50 – 3.10 ptg	Pelajar : Tay Chai Jian Penyelia : Prof. Dr. Norsarahaida S Amin PD : PM. Dr. Sharidan Shafie Pengerusi : Prof. Dr. Shaharudin Salleh
3.15 – 3.35 ptg	Pelajar : Wan Nur Faqihah Bt. Mohd Zaki Penyelia : PM. Dr. Mukheta Isa PD : PM. Dr. Maslan Osman Pengerusi : Pn. Wan Rukaida Wan Abdullah
3.40 – 4.00 ptg	Pelajar : Nur Farah Natasha Bt. Ahmad Tamizi Penyelia : Dr. Zaiton Mat Isa PD : Pn. Wan Rukaida Wan Abdullah Pengerusi : Dr. Maslan Osman

BILIK MESYUARAT UTAMA
1 JUN 2016 (RABU)

8.30 – 8.50 pagi	Pelajar : Emulyati Bt. Mohd Rafi Penyelia : En Che Rahim Che Teh PD : En Hamisan Rahmat Pengerusi : PM. Hazimah Abdul Hamid
8.55 – 9.15 pagi	Pelajar : Faten Nur Amira Bt. Amran Penyelia : En Che Rahim Che Teh PD : En. Hamisan Rahmat Pengerusi : PM. Hazimah Abdul Hamid
9.20 – 9.40 pagi	Pelajar : Nur Fathiah Bt. Sakiam Penyelia : PM. Dr. Munira Ismail PD : En Che Rahim Che Teh Pengerusi : En. Hamisan Rahmat
9.45 – 10.05 pagi	Pelajar : Nurhanisa Bt. Ahmad Fadzil Penyelia : PM. Dr. Munira Ismail PD : En Che Rahim Che Teh Pengerusi : Pn Halijah Osman
REHAT	
10.35 – 10.55 pagi	Pelajar : Gloria Chrisma Jeffery Penyelia : En. Ismail Kamis PD : Dr. Rashidah Ahmad Pengerusi : En Che Rahim Che Teh
11.00 – 11.20 pagi	Pelajar : Zulkifli B. Rambeli Penyelia : PM Dr Ismail Mohamad PD : Dr. Arifah Bahar Pengerusi : Dr Rashidah Ahmad
11.25 – 11.45 pagi	Pelajar : Nor Atikah Bt. Mat Zain Penyelia : Dr. Fong Wan Heng PD : PM. Dr. Yudariah Mohamad Yusof Pengerusi : Dr Arifah Bahar
11.50 – 12.10 tgh	Pelajar : Nurul Izzati B. Muhammad Penyelia : Dr. Syarifah Zyurina Nordin PD : Dr. Rashidah Ahmad Pengerusi : PM. Dr. Yudariah Mohamad Yusof

REHAT	
2.00 – 2.20 ptg	Pelajar : Zainab Bt. Mahamud Penyelia : Prof. Dr. Tahir Ahmad PD : PM. Dr. Mukhidin Muminov Pengerusi : Dr. Niki Anis Abd Karim
2.25 – 2.45 ptg	Pelajar : Nazurah Bt. Ali Hassan Penyelia : Dr. Fong Wan Heng PD : Prof. Dr. Norhaniza Sarmin Pengerusi : PM. Dr. Mukhidin Muminov
2.50 – 3.10 ptg	Pelajar : Nurul Atiqah Bt. Talib Penyelia : PM. Dr. Mukhidin Muminov PD : PM. Dr. Nor'aini Aris Pengerusi : Dr. Nor Muhainiah Mohd Ali
3.15 – 3.35 ptg	Pelajar : Lim Wei Keat Penyelia : Dr Robiah Adnan PD : Dr Niki Anis Ab Karim Pengerusi : PM. Dr. Nor'aini Aris
3.40 – 4.00 ptg	Pelajar : Nur Edrina Fazleen Bt. Mohamed Penyelia : PM. Dr. Norma Alias PD : Dr. Yeak Su Hoe Pengerusi : Dr Niki Anis Ab Karim

Modulated Heating Wave of Porous Media of an Infinite Extend
Afiqah Binti Abas & En Ibrahim Bin Jais

Convection can be described as an equilibrium process due to temperature variation in a media. For a horizontal fluid layer heated from the bottom and cooled from the top, buoyancy plays as a destabilizing role. When the temperature difference is large enough and buoyancy exceeds the stabilization effect of viscosity, the system loses its stability and causes the movement of fluid flow. This flow is named as Rayleigh-Benard convection. The critical Rayleigh numbers for the onset of convection were determined and the stability ranges of all flow patterns were assured by increasing or decreasing the Rayleigh number. A travelling wave which took the form of $cos\pi(x - Ut)$ results in the motion following the travelling wave when $U = 0$ was investigated by Banu (2001). The minimal $k = \pi$ for $coskx$ guarantee a dangerous transition. The heat transfer rates at different flow patterns were measured by the average Nusselt number. The Finite Difference method is applied with Nine Point Arakawa method used for the nonlinear term and thus, infinite extend is considered. When the Rayleigh number is low, convection happens at location but when Rayleigh number is high, the convection enters the chaotic region.

Mathematical Model of Unsteady Boundary Layer Flow along a Symmetric Wedge in a Micropolar Fluid

Aishahtul Rabiah binti Halim & Dr. Anati binti Ali

In fact, micropolar fluid is a good model for studying many complicated fluid motion. In this research, mathematical model of the unsteady boundary layer flow along a symmetric wedge in a micropolar fluid is considered. The governing boundary layer equation are first given in dimensional form along with the boundary conditions into the non-dimensional form of equationsby introducing the stream function and then resulting of partial differential equations were transform to the ordinary differential equation by using a similarity variable. The governing equations of the present study are compared to those models of Newtonian fluid including its dimensional form, stream function form up to its form of ordinary differential equation. The model are discretised according to the Keller-Box method which consistof discretization using a finite difference method, newton's method for linearization, the block tridiagonal matrix and block elimination method. Some results from the previous study are shown which include the velocity, skin-friction coefficient, the local Nusselt number and temperature profile.

Clustering Daily Closing Stock Prices for Global Raw Commodities

Armaeni bt Agus & Dr Norhaiza Ahmad

Commodity stock prices is one type of financial time series data. It is highly dimensional and unstable because of fluctuation in supply and demand. Due to this problem, the purpose of this study is to determine whether different closing stock prices move together in the market place. This paper explores on identifying similar raw commodities in daily closing stock prices using unsupervised Hierarchical Agglomerative Clustering method based on dissimilarity matrix. However, since financial time series data typically do not exhibit a multivariate normal distribution, the usual Euclidean distance cannot be applied to quantify the degree of dissimilarity between commodities. Instead, distance function which could measure the structure of dependence between objects such as correlation distance type is more appropriate. Here, we have compared two types of correlation distances, i.e. Pearson correlation coefficient and Spearman's Rank Corelation on Hierarchical Agglomerative clustering to identify similar raw commodities that move together in market place. As a result, we have found that both methods produce different clustering results. However, in both clustering results, clustering closing stock prices for gold and silver are found to always move together.

Modelling and Forecasting the Malaysian Crude Palm Oil using Box-Jenkins and Time Series Regression Method

Darma Binti Abdul Mida & Prof.Madya Dr Maizah Hura bt Ahmad

Forecasting is a study of determining the direction of future trends of events or variables using time series data. The current study has two objectives which is first to forecast the price and production of crude palm oil using Box-Jenkins method and Time Series Regression. The second objective is to compare the performances of the forecasts. The data used are price and production of Malaysian crude palm oil.The software used in analyzing the data are Microsoft Excel and Minitab-16.The first step in both models is to find the pattern by plotting the data. The autocorrelation function (ACF) and partial autocorrelation function (PACF) are explored to reveal the patterns of the data. Two patterns are discovered in the data used in this study which are trend and seasonal. To compare the performances of these two methods, mean absolute percentage error (MAPE) and mean sum of error (MSE) are calculated. The most appropriate method is the method that gives the lowest measure of forecast error. From the error measures, it can be concluded that Box-Jenkins performed better than Time Series Regression in forecasting the future values of the price and production of Malaysian crude palm oil.

Prediction of Currency Exchange Rate Using Artificial Neural Network and Exponential Smoothing

Eileen Lim Yi Xin & Puan Halijah Osman

The currency exchange market is one of the most complex dynamic markets with the characteristics of high volatility and irregularity. Prediction of currency exchange rate is difficult yet important in order to yield maximum profit. This research focuses on forecasting of currency exchange rate by Artificial Neural Network (ANN) and Exponential Smoothing (ES). ANN has been proven to be a universal approximator which able to capture any complex relationships while ES is a classical method used in financial forecasting. A two years data from 1/4/2013 to 31/3/2015 are modelled to predict the exchange rate of 1/4/2015 to 30/4/2015 for five currencies, namely United State Dollar (USD), Great Britain Pound (GBP), Japanese Yen (JPY), Singapore Dollar (SGD) and New Zealand Dollar (NZD) against the Malaysian Ringgit (MYR). Both ANN and ES are performed by using STATISTICA 10 software. The results are evaluated in terms of Mean Absolute Error (MAE), Mean Square Error (MSE) and Mean Absolute Percentage Error (MAPE). The comparison of forecast accuracy shows that ANN outperforms ES since the MAE, MSE and MAPE calculated by ANN are smaller than ES. In general, ANN and ES are proven as acceptable models in forecasting currency exchange rate.

Alternating Direction Implicit (AD) Method For The Elliptic Equation

Emulyaty Binti Mohd Rafi & Che Rahim Che Teh

Finite Difference Method for Elliptic equation had been used widely to solve a lot physical problems. However, it turns out that analytical approach for two and more dimension equations are more complicated than those of one variable,so numerical approach will be used to approximate the solution. Here we will usebetween Alternating Direction Implicit (ADI) and Gauss-Seidel Method to find the numerical solution. The results obtain are compared with exact solution to show that ADI method are accurate compare to the Gauss-Seidel iteration method.

Tensor Analysis

Farhah Aqilah binti Abdul Aziz & Prof. Dr. Mohd Nor bin Mohamad

Tensor Analysis is an important tool of mathematics in the field of science and engineering. To use it, we have to understand the basic properties of tensor analysis. The purpose of this study is to investigate various fundamental concept of vector via tensor analysis together with some of their corresponding physical and geometric interpretations. The basic definitions of tensor analysis are explained in detail throughout this research. Selected properties and operations involved in tensor analysis has been studied in order to solve the mathematical problems. The process of deriving and proving the properties associated with tensor analysis has been discussed. Numerous examples are given to grasp this topic easily and clearly.

Finite Element Method And Finite Difference Method For Solving The Second Order Linear Differential Equation

Faten Nur Amira Binti Amran & Encik Che Rahim Che Teh

The purpose of this study is to investigate the application of numerical method on second order linear differential equation by applying Finite Difference Method (FDM) and Finite Element Method (FEM). FEM involves the finding of approximate solutions on boundary value problems of second order linear differential equation. The FEM calculation is solved manually whereas the FDM calculation is solved manually and using MATLAB. The calculated results are compared with exact solution to show that FEM generally will produce more accurate results compared to FDM.

The Application of Generalized Linear Model (GLM) in Insurance Claims
Foo Weoi Ming & PM. Dr. Fadhilah Yusof

Count data are non-negative integers. They represent the number of occurrences of an event within a fixed period. The insurance claims are categorized under count data where the insurance company needs to manage and monitor them approximately. Generalized linear models (GLM) is a method to model insurance claims. Poisson regression, which is a part of class of models in GLM, is widely used to analyze count data. It uses natural log as the link function and models the expected value of response variable. The natural log in the model ensures that the predicted values of response variable will never be negative. The response variable in Poisson regression is assumed to follow Poisson distribution. One requirement of the Poisson distribution is that the mean equals the variance. And the maximum likelihood estimation (MLE) method is used to estimate the coefficients of parameters. In real-life application, count data often exhibits overdispersion. Overdipersion occurs when the variance is significantly larger than the mean. When this happens, the data is said to be overdispersed. Overdispersion can cause underestimation of standard errors which consequently leads to wrong inference. Besides that, test of significance result may also be overstated. Overdispersion can be handled by using quasi-likelihood method. In addition, Chain-Ladder method is a statistical method that use as GLM to forecast the amount of reserves in a run-off triangle that must be established in order to cover future claims. As a result, GLM is good for managing and monitoring the insurance claims.

SOLVING 0-1 KNAPSACK PROBLEM USING
GENETIC ALGORITHMS AND DYNAMIC PROGRAMMING
Gloria Chrisma Jeffery & Tuan Haji Ismail Bin Kamis

Knapsack problem is an important branch in operational research. It concerns about to determine the maximum sum of profits of the knapsack provided that a number of items are given which have certain weights and capacity limit to the knapsack. Knapsack problems arise in many domains such as cargo loading, industrial production, budget control, financial management, project selection, capital budgeting, menu planning, selection of journal for a library and etc. The main objective of the study is to find the maximum sum of profits for a few set of data of 0-1 Knapsack problems. In order to achieve the objective of the study, Dynamic Programming (DP) and Genetic Algorithms (GAs) are used in this study. Besides that, this study will also compare the performances of the two methods. The result shows that it was more suitable to use DP method when the total number of items are small since it required less effort to track back the optimal solution. However, when dealing with large number of items, GAs method was more convenient to be used, even though it might not necessarily giving the best solution to the problem which in real life will cause a loss of profit.

Analyzing Survey Data on Car Preference Factors Using Structural Equation Modeling

Ina Nur Hazirah Binti Samudin & PM. Dr. Ismail Mohamad

Structural Equation Modeling (SEM) is very popular in many disciplines such as psychology, political science and education.SEM is a methodology for representing, estimating and testing a network of relationship between latent and measured variables. The growth and popularity of SEM is attributed to a large part to the advancement of software development such as WarpPLS. The purpose of this research is to study the relationship between car preference factorstowards the purchase behaviour of final year UTM students using SEM. The questionnaire was distributed via online for measuring the relationship between the car preference factorstowards the purchase behaviour of final year UTM students. The results of questionnaire was validated and tested for further statistical analysis through Confirmatory Factor Analysis (CFA). Among all the factors discussed in this research, design factor played the most significant role in purchasing a car. There exists mediating variable where this variable causes the indirect effects of an independent variable. In this study, the mediating variables are cost and design where the preference is independent of performance given the cost and design variables. This research can assist car producers to increase their sales by focusing on those important factors.

Two Tumor Models With And Without Drug Infusion
Izzah Afiqah Binti Harun & Dr Faridah Mustapha

In this study, a relevant biological through mathematical background materials are presented followed by mathematical modelling of tumor growth with and without drug infusion. The process of understanding the behaviour of tumor cells ,immune cells and also normal cells in the presence and absence of drug leads to different types of model which can be categorized as predation or competition. The research focused on analysing the system of differential equation used in the model in the case of tumor growth that includes the normal cells and immune cells response. Overall, the aim of this study is to obtain and to show the stability of the system in the presence and absence of drug towards cells involved. The model is investigated and analysed theoretically and through computer simulation, Maple 2015 in order to determine the stability of equilibrium points. At the end of this study, the different between model with and without the presence of drug are able to understand and investigated.

Free Vibration Antisymmetric Angle-Ply Cylindrical Sheel Under Classical Theory

Janietha Myrable Justin & PM Dr K.K Viswanathan

Free vibration of antisymmetric angle-ply laminated cylindrical shell is studied using spline function approximations. The equations of motion of the shell are derived by extending Love's first approximation theory. Assuming the displacement functions in a separable form and these functions are approximated using splines. The collocation procedure is applied to obtain a system of couple equations in terms of displacement functions. The system becomes a generalized eigenvalue problem using boundary condition and this problem is solved numerically to find the eigen frequency parameters and associated eigen vectors as spline coefficients. The effect of various parameters such as length parameter, the relative thickness of the layers, and the circumferential wave number under different boundary conditions on the frequencies parameter are analysed to investigate the behaviour of shell structure.

The MSEIR Model of Infectious Diseases using Ordinary Differential Equations

Josephine Anak George Jimbun & Dr. Faridah Mustapha

This research study the applied of ordinary differential equations on the mathematical model of infectious diseases. Many models for the spread of infectious diseases in population have been analyzed mathematically and applied to specific diseases. This research specifically analyzed generally the model of infectious disease namely MSEIR. MSEIR model build of five (5) compartments. The five (5) compartments are immune class (*M)*, susceptible class *(S)* , exposed class (*E)*, infectious class (*I)*, and lastly recover class (*R)*. This model differs since it considers the size of the population is not constant. The equilibrium points of the model are obtained and it shows that there exist for both disease-free and endemic. The method used to analyze the stability of the equilibrium point is Routh-Hurwitz Criteria with *k = 4*. The disease-free equilibrium is stable when basic reproduction number $R_0 < 1$ and the endemic equilibrium is stable when $R_0 > 1$.

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Mathematical Modelling of Fluid Flow under the Effect of Sclera Buckling

Khairun Ameerah bt Zulkifly & Dr. Zuhaila bt Ismail

Sclera Buckling (SB) is one of the approach to treat Rhegmatogeneous Retinal Detachment (RRD). RRD occurs due to the pressure of the accumulated fluid that flow under the detached retina and causes further detachment which could lead to loss of vision if it is not treated. SB is a silicone buckle that is sutured around the eye ball to prevent fluid leakage and will cause indentation to the eye ball. A paradigm mathematical model is developed to understand the behaviour of the fluid under the effect of SB. The Navier-Stokes equations is approximated by the lubrication theory to obtained the governing equations. Using analytical method, the velocity profiles, pressure and streamlines of the fluid flow is analyzed using MAPLE 15. Numerical results from COMSOL Multyphysics are generated as a comparison to the results obtained using MAPLE 15. The results have shown that it is possible to predict the behaviour of the liquefied vitreous humour under the effect of SB.

Dynamic of Blood Flow in the Microcirculation Network

Lee Wei Chee & Wan Rukaida Wan Abdullah

The flow of blood in microcirculation network is one of the problems in mathematical biology that requires the knowledge of fluid flow.It is believed that the Fahraeus effect, Fahraeus-Lindqvist effect and phase separation have to be taken into account when developing the model simulation. This study was aimed to identify the mathematical model of the blood flow in microcirculation network. Coupled advection-diffusion equations are solved using finite difference method to simulate hematocritflow in the symmetric and asymmetric arcade network. Findings showed that the diffusive term takes an important role in the flow of microcirculation network. In addition, the mathematical study showed that the flow in the arcade network is stable and steady state is achieved. In summing up, recommendation and conclusion based on the data analyzed were also given in this study.

Face Recognition Using Principal Component Analysis and Eigen Faces
Lim Wei Keat & PM. Dr. Robiah Adnan

Computers that recognize faces could be applied to a wide variety of problems, including criminal identification security system, image and film processing, and human-computer interaction. However, a computational model of face recognition is quite tedious to be developed because faces are complex, multidimensional, and with ranging meaningful visual stimuli. Therefore, this paper mainly addresses the building of face recognition system by using Principal Component Analysis (PCA). PCA is a statistical approach used for reducing the number of variables in face recognition. In general, this algorithm is a technique for simplifying a dataset, by reducing multidimensional datasets to lower dimensions for analysis. Data used in this study are JPEG image with image resolution of 180 by 200 pixels of 10 males. The colored face images are converted to gray scale images as gray scale images are easier for applying computational technique in image processing. In PCA, every image in the training set is represented as a linear combination of weighted eigenvectors called Eigen Faces. These eigenvectors are obtained from covariance matrix of a training image set. The weights are obtained after selecting a set of most relevant Eigen Faces. Recognition is performed by projecting a test image onto subspace spanned by the Eigen Faces and then classification is done by measuring the minimum Euclidean distance and Mahalanobis distance. The results show that theMahalanobis distance performed better than the Euclidean distance in identifying or recognizing the correct image. A high-level language MATLAB will be used to implement the algorithms.

The Analytical Hierarchy Process (AHP):
Multi-Criteria Decision Making for Selection of Academic Staff at Faculty of Science, UniversitiTeknologi Malaysia (UTM)

Martini Yahya & Dr Rashidah Ahmad

Evaluating candidates' suitability for a selection of academic staff is an important tool for a university to select the mostsuitable candidates for required posts. As there are increasing improvements in the field of education, universities around the world demand high quality and professional academic staffs. The present paper examines Multiple Criteria Decision Making (MCDM) method which is Analytic Hierarchy Process (AHP) for selecting the most suitable academic staff at the Faculty of Science, UniversitiTeknologiMalaysia, UTM. AHP method helps permit pair-wise comparison judgments in expressing the relative priority for criteria and alternatives that is translated from qualitative to quantitative data by considering the criteria that influence decision made. This study has applied five criteria and fifteen sub-criteria for selecting the best one amongst five candidates for the academic staff position in the Faculty of Science, UTM. The selection criteria of Academic, General Attitude, Interpersonal Skill, Experience, and Extracurricular Activities that used in this study are determined based on some literature reviews and knowledge acquisition by interviewing Assistant Registrar and Head of Department from faculty. AHP method managed to select the best academic staff since possesses the first ranked of the generated candidate profile. Expert Choice 11.0 and Microsoft Excel 2007 are used to assist in accomplishing the calculation involved.

Queuing Theory & Simulation Analysis at MPJBT

Mohamad Amirul Afif Mohamad Zani & Dr. Arina Bazilah Aziz

Queuing theory is a study which investigate the effectiveness of a queuing system in a certain place. Majlis Perbandaran Johor Bahru Tengah (MPJBT) is one of government sector which in charge of managing in Johor Bahru district. MPJBT also providing service counter such as multi-payment and multi-application. Hence, this customer service facility is encountering queue problem due to overcrowd and cause dissatisfaction of customer. Therefore, the main purpose of this study is to investigate the queuing model at MPJBT's Customer Server focussing on the service rate. Two months data provided has been analysed using Easyfit software in order to fit the distribution and to find the value of arrival rate and service rate. Moreover, the simulation model has been built to show the process flow and resulting performance measures by using Simul8 software. By the result, it shown that current system in the waiting room was not good performances. Then, an experiment was conducted in order to investigate the effect of changing the number of service counter. The result of the experiment indicate that the change of the number of service counter does or not improve the efficiency and the customer satisfaction.

He's Homotopy Perturbation Method For Ordinary Differential Equations

Mohamad Shahiir bin Saidin &Pn Halijah bt Osman

This study adopts the He's Homotopy Perturbation Method (HPM) to solve linear and nonlinear ordinary differential equations. HPM is an approximate analytical method that usually used to solve nonlinear problems. In this study, we applied this method to shock damper dynamics problem involving linear and nonlinear equations. The time response of the solution obtained by a few iterations is presented for nonlinear problem and the current results are then compared with Runge-Kutta method in order to verify the accuracy of the method. It is shown that there is excellent agreement between the two sets of results. This finding confirms that the proposed He's Homotopy Perturbation Method is a powerful and efficient tool for solving linear and nonlinear problems.

Ordinary Differential Equation ofTumor Growth with Immune Response and Drug

Mohd Rashid bin Admon & PM Dr Normah bt Maan

Tumor growth problem can be described by modelling the situation using differential equations. This work presents ordinary differential system of tumor growth with immune response and cycle phase specific drug. Three different cases which are drug free systems in the absence of immune response, drug free systems with the presence of immune response and drug system with immune response are considered. Stability analysis for each cases is discussed and numerical solution for certain chosen parameters in stability region is presented. For drug free system in the absence of immune response, the stability map produced two regions of stability which is tumor decay and tumor growth. In the presence of immune response, stability map shows that the region for tumor growth is reduced. These results are also the same when considering the drug in the system but the population of tumor is decreased. Combining the immune response and cycle phase specific drugs to the model provides a better way to kill the tumor cells.

Tourism Forecasting using Generalized Exponential Smoothing

Muhamad Hanif Bin Azmi & Dr. Ani Shabri

Forecasting is about predicting the future as accurately as possible, given all of the information available, including historical data and knowledge of any future events that might impact the forecasts. In this research, forecasting was performed on tourism data series by using Generalized Exponential Smoothing (GES). This forecast evaluated on monthly data series of the number of tourist arrivals in Malaysia and Indonesia from year 1999 to year 2013. Monthly data from year 1999 to year 2012 were used to develop the GES model while the remaining monthly data in year 2013 were used to evaluate the performance of the forecasting values. Our discussion about different time series models is supported by giving experimental forecast results performed on real time series datasets of tourist arrivals in Malaysia and Indonesia. Then, to evaluate forecast accuracy as well as to compare among different models fitted, we have measures the performances of Mean Absolute Percentage Error (MAPE) and Root Mean Square Error (RMSE). Furthermore, we present the obtained time series plot which graphically depicts the closeness between the original and forecasted observations. To manage such a great deal of data observed, this research was facilitated by used of Microsoft Office Excel 2010.

The Transmission Dynamics of Measles Outbreak

Muhamad Hanis Nasir & Dr. Fuaada Siam

The purpose of this study is to study the transmission dynamics of measles outbreak. Measles is one of the infectious disease that can easily spread through the population. A compartmental epidemiological model had been employed in this study to illustratethe dynamics of measles disease through the population. In this model, the population had been divided into four group of individuals (susceptible (*S*), exposed (*E*), infected (*I*) and recovered (*R*)). Exposed class is a latent period when someone had been incontact with infected person but not yet infected. In this model, some of exposed individuals will go to measles therapy and treatment. Automatically, they will become recovered person. The model is studied using system of Ordinary Differential Equations (ODEs). In order to check the stability of the model, Routh-Hurwitz Criterion method had been employed in this study. The equilibrium points of this model are divided into two, disease-free equilibrium point (DFEP) and endemic equilibrium point (EEP). Both equilibrium points are stable but the points depend on the basic reproduction number, R_0. $R_0$is a threshold value that determine either the disease extinct or spread out in the population. Calculation of R_0 also had been given in this study. The final work of the study is providing the numerical simulation of the measles outbreak. The parameters used are to predict the disease outbreak in a small population (N =1000). The parameter of percentage of exposed individuals go to measles therapy had been varied in the numerical simulation in order to investigate the impact to the measles outbreak. The results show a good prediction when higher percentage go to measles therapy, the number of recovered individuals increases faster within a few years.

SHIFT JOB NEIGHBOURHOOD HEURISTICS FOR SINGLE MACHINE FAMILY SCHEDULING PROBLEMS

Muhammad Aiman Rifdi Bin Arifin & Dr Syarifah Zyurina Bt Nordin

In this study, we consider a single machine scheduling problem in minimizing the maximum lateness L_{max} of N jobs in the presence of sequence independent family setup time ,S_f .The problem is to schedule the arrival job in the system with setup time and the job will divided into families .Our objective is to minimize the maximum of lateness,L_{max} of N jobs .The setup time is required at time zero when family condition is same and a new batch of family is obtained .We also apply EDD rule in the heuristics method to get maximum lateness and improve this rule by using shift job forward and backward method .Every job within family each family will be arranged according to the due date of its job. We propose two neighborhood, local search method forward and backward algorithm .Furthermore, we compare the neighbourhood heuristics solutions obtained with lower bound and discuss whether the backward or forward shift will improved the solution quality. We perform a computational for both algorithm and compare the results .From the comparison, backward shift algorithm is better compared to the forward shift algorithm in minimizing the maximum lateness .

SIR Model on the Spread of Dengue Disease in the State of Selangor, Malaysia

Mohammad Ridhwan Reyaz Ahmad & Dr. Fuaada Siam

Dengue disease poses a serious threat for tropical places such as the state of Selangor, Malaysia. This study will simulate a model based on the SIR (Susceptible, Infected, Recovered) model on the spread of the dengue disease. In this study, it is assumed that the population of the vector (mosquito) is constant and although there are four types of dengue viruses, it is also assumed that a human can only get infected by one type of dengue virus. Using the parameters values provided in the literature a simulation of the model were carried out using MATLAB and the basic reproduction number were also obtained. The basic reproduction number obtained was $R_0 > 1$, meaning that the disease in the state of Selangor will not die out in the future. The simulation was carried out with various initial susceptible human population, (S_h) and infected human population, (I_h). It is found that the larger the susceptible human population, the faster the disease will spread, and the larger the infected human population, the more the maximum value of infected human population. A simulation with various initial number of infected vector was also provided, it is found that the larger the initial number of infected vector the faster the maximum value of infected human is reached. Through this study, it is shown that the case of dengue disease in the state of Selangor, Malaysia is not severe and not worrisome. Dengue disease will not be an epidemic for the state of Selangor in the near future.

Solar Radiation Forecast Using Hybrid SARIMA-ANN Model

Muhammad Zillullah Mukaram & PM Dr. Fadhilah Yusof

By having an accurate model of solar radiation we can understand the patern and characteristic of solar radiation data. Solar radiation forecasting is essentialin maximizing the performance of a device that may convert solar radiation into electricity.Hence, a hybrid model of Artificial Neural Networks (ANN) and Seasonal Auto-regressive Integrated Moving Average (SARIMA) is proposed to forecast solar radiation data from 2 stations in Johor Malaysia. The solar radiation data is first used to model the SARIMA model. The SARIMA model is chosen based from the lowest Akaike information criterion (AIC). The residual of the fitted value of the SARIMA model is then computed. The residual is then used to model the ANN model. The forecasting performance of this model is then compared to 2 other models, i.e., the SARIMA model and the ANN model. Mean square error (MSE) and mean absolute percentage error (MAPE) is used in comparing the 3 models. Among the 3 methods the hybrid model has the lowest MAPE and MSE in both stations.

Implementation of Numeric and Exact Matrix Operation Algorithms Using C++

Nadia bt Mohd Jaszari & PM DrNor'aini Aris

In this work, the numerical algorithms for performing real matrix operations are implemented with the application of the modular programming technique. The algorithms constructed are then modified to perform algebraic operations in the integer modulo domains. Further, themodified algorithms are applied for computing the determinant and the inverses of matrices in the integer modulo domain. In particular, computations in the modular integer domains are applied to solving the Hilbert matrix, using the exact computation approach, which overcomes the ill-conditioning property of the matrix. The tedious computations are performed by constructing the algorithms using C++ computer programming language. The results revealed that the modular algorithm illuminated by the C++ programming, assisted effectively in the computation of numeric and exact matrix operation algorithms.

Optimizing Arrival Flight Delay Using Simulated Annealing

Nadrah binti Ramli & PM Dr Hazimah Abdul Hamid

This research will highlight on the topic of optimizing the arrival flight delay to reduce serious air traffic delay by using Simulated Annealing. Simulated annealing is a heuristic method, which means a procedure that is likely to find a very good feasible solution, but not certainly an optimal solution, for the specific problem being considered.The procedure often is a completely developed or established iterative algorithm, where each iteration requires conducting a search for a new solution that might be better than the best solution found previously. When the algorithm is bring to an end after a reasonable time, the solution it provides is the best one that was found during any iteration. Probability of Boltzmann Distribution and cooling schedule will be used to get the optimal solution of the arrival flight delay. The result for optimization arrival flight delay will be calculated by using Microsoft Excel.

Spanning Tree Graphs in Multi-loop Electrical Circuits

Nazurah binti Ali Hassan& Dr. Fong Wan Heng

Spanning tree, which is commonly used in graph theory,can be used to solve complex problems in electrical circuits.In electrical circuits, combination of series and parallel type of electrical circuits form a multi-loop electrical circuit network. In this research, branch voltages and currents in multi-loop electrical circuit problems are solved using loop method and cut-set method giventhe values of resistances in the circuit. The electrical circuits are first transformed into their respective connected graphs, followed by forming subgraphs of a larger graph which are the spanning tree graphs. Then, voltage and current equations that satisfy both the Kirchhoff's Lawsareobtained using loop and cut-set methods based on the spanning tree graph.It is also possible that all the variables of the elements in the electrical circuit are not given. This type of problem can be analysed using the network topology approach. Thisapproach also uses spanning tree graph, loop and cut-set methods to analyse the branch voltages and currents of electrical circuitswith unknown circuit variables by deducing some assumptions. Thus, spanning tree graph provides a base and plays an important role insolving the branch voltage and current values by implementing the methods discussed in this research.

Solving Prey-Predator Model Using System of Linear Ordinary Differential Equation

Noor Hazwani binti Abdul Halim & PM Dr Hazimah binti Abdul Hamid

The main concern of all species in any ecosystem or natural environment is rooted in the battle for survival. This constant battle for survival is most highlighted in the two main modes of species interaction such as categorized as predation or competition. This research focused on applying biological mathematics to analysing predation relationships, especially the relationship between the Canadian Lynx and the Snowshoe Hare. This predation relationship is quite special, because these species interact in a relatively isolated manner. This means their populations varied in a regular cycle due to lack of significant external variables on the relationship. These population variations can be solved mathematically using systems of linear ordinary differential equations, built of course upon several minimizing assumptions in order to exclude huge variables. This mathematical model, the Lotka-Volterra, can then be analysed analytically or using computer simulation, which is MATLABto determine period lengths, phase portraits, critical points, and other practical information to the reality of the relationship. Lastly, the results will show extinction prevention specialists the years and seasons where extinction is naturally possible, preparing them ahead of time to do intense tagging and developing natural habitats as safety precautions.

Solving Two Dimensional Acoustic Wave Equation Using Finite Difference Method

Noorehan Binti Yaacob & Tuan Haji Hamisan Bin Rahmat

This research was conducted to solve the analytical and numerical solution of two dimensional acoustic wave equations. The method of Separation of Variables and Finite Difference Method were chosen to solve two dimensional acoustic wave equations. The algorithm for each method has been developed and the solution of the problem is simplified. In calculating the result, the Matlab programming and the software of Microsoft Excel were used. Exact solution is also shown as standard reference in comparing the results of these solutions.

Applications of Minimum Spanning Tree Using Kruskal's Algorithm
Nor Atikah binti Mat Zain & Dr Fong Wan Heng

Graph theory is the study of graphs that concerns with the relationships among the edges and vertices, in the domain of mathematics and computer science.The minimum spanning tree problem is one of the oldest graph problems in the theoretical computer science. In the 1920s, the minimum spanning tree was invented which solved the problem during the electrification of Moravia. This graph theory problem and its various applications have inspired many other researchers to look for alternative ways of finding a spanning tree of minimum weight in a weighted, connected graph. The main aimof this research is to find the minimum total weightfor the graph of a network that would connect all the nodesusing Kruskal's algorithm.Here,Kruskal's algorithm is used tofind an edge of the least possible weight that connect any two nodes in the graph. In this research, the minimum weight between the nodes in a connected graph is determined by using Kruskal's algorithm. This study presents some applications of minimum spanning tree on minimum connector problems which are the delivery service from UTM to four malls and the travel planning using airlines. Hence, the minimum cost and time of delivery service and the minimum distance for travel planning are obtained using Kruskal's algorithm.

Characterizing the Type of River Flow in Johor
Nor Hidayah binti Hasan & Dr. Norhaiza Ahmad

Understanding the type of river flow is important for strategic planning in water resource management. This study focuses on characterizing the flow of river discharge of eight rivers in the State of Johor for a period of 45 years using the Flow Duration Curve (FDC) based on N-equal class interval approach. FDC measures the exceedence flow probability which measures the percentage of time that the river flow equal or exceed a certain discharge interval. This curve is dependent on complete data observations (i.e. positive entries) and appropriate number of class intervals to be constructed. However, the river discharge database of these eight rivers consist of about 11% negative entries. In addition, the frequency of occurrence in each river are different and may affect its exceedence probability. In this study, a subset of complete data are chosen by imputing selected negative entries using the average of 7-day nearest neighbour method to avoid insufficient data for analysis. We have also compared different selection of class interval at 20, 30 and 40 partitions to construct the FDC in order to estimate the exceedence probability of flow discharge at each river. The results show that all eight rivers in Johor can be characterized as low-flow since the frequency of occurrence is highest at the lowest interval. Due to the different coefficient of variation of discharge level at each river, the percentage of time that the river flow equal or exceed the discharge interval is different and is dependent on the number of class interval. For rivers with high coefficient variation in discharge, the percentage of time that river flow equal or exceed the lowest interval is generally high. For instant, Sg. Lenik shows 14.3-82.9% based on the lowest discharge interval based on 20- 40 class interval. For rivers with low coefficient variation such as Sg. Lenggor, the percentage of time that river flow equal or exceed is generally low at 0.88-2.69% based on 20-40 class interval. In addition, Sg. Johor shows low flow at about 65% at the lowest class

interval of   0-17.94 m^3/s (at 40 class interval). In the interest of water supply, this river would be able to supply to its neighbouring Singapore since the flow required to supply is only 5 m^3/s.

Interest Rates on Central Bank of Malaysia
Norfarahatika Binti Shukor & Dr Haliza Abdul Rahman

The aim of this research is to develop a methodology to find the best estimator for the selective model of Stochastic Differential Equation (SDE) Model. The model contains parameters which alter its behavior. Vasicek (1977) is one of the recognized SDE Model in mathematic finance, which is useful in modeling short-term interest rates. Two methods have been utilized for Vasicek model such as Ordinary Least Square (OLS) and Maximum Likelihood Estimation (MLE). The first method is the ordinary least squares estimation procedure. The ordinary least squares (OLS) estimation procedure was developed from regression analysis. Regression analysis is probably the most common statistical method in statistical data analysis and the ordinary least squares the most common used estimation procedure in statistics. Next, the idea of maximum likelihood estimator to determine the parameters that maximize the probability or likelihood of the sample data has been the one of the most widely used methods. The data sample consists of Conventional Interbank Rates and Islamic Interbank Rates for the period from 1 January 2014 to 7 June 2015 collected from the Central Bank of Malaysia (BNM). This assessment is done by using Microsoft Excel. The parameters obtained from both methods will then use to calculate the predicted data to find the error. As a result of the performance of the two methods, it is found that maximum likelihood estimator generate the best parameter estimates than least square regression due to the smallest Root Mean Square Error (RMSE) value.

Modelling Structure of Rainfall and Temperature using Copula Method

Norhakim bin Ramli & Dr. Shariffah Suhaila Syed Jamaluddin

Copulas is a function that joins or couples multivariate distribution functions to their one dimensional marginal distribution functions. It enable us to extract the dependence structure from the joint distribution function of a set of random variables and at the same time to separate the dependence structure from the univariate marginal behavior.In this case, the dependency of two distribution have to be considered and one way to show them is using copula method. Three type of copula model which are Normal, Student-t and Clayton copula are being focused on. These three copula will be compared to find the best-fitted copula. Two sets of data which are the rainfall and temperature (1980-2013) from Subang Station are used to show the dependency between these two variables. For each month, the rainfall data then will be observed on how it was distributed as univariate distribution (gamma, Weibull or lognormal). As a result, it shows that rainfall was distributed as univariate Weibull distribution for most of the month. For the temperature data, it is set to follow the univariate uniform distribution. The results obtained from marginal distribution for rainfall and temperature will be used to find the three copula function and their parameters. The best-fitted copula will be chosen by the minimum value of AIC obtained. In this case study, R-software was being used to find all the parameters involved.

Statistical Analysis On The Factors That Affecting The Insurance Premium Selection

Norsholeha binti Abdullah & Dr. Haliza binti Abd. Rahman

The purpose of this study is to perform statistical analysis on the factors relating to insurance premium selection. Nowadays, the awareness of the public has increased in the importance of having insurance policy. Important factors relating to insurance premium selection are age, gender, smoking status, occupation classes, marital status, etc. In this study, four methods are used which are chi-squared test, hypothesis testing, one-way analysis of variance (ANOVA), and multiple linear regression. The data selected are from 2014 and 2015 consisting of 250 policy holder from Prudential Assurance Malaysia Berhad. In regression, insurance premium is the dependent variable and the independent variables consist of gender, age, occupation classes and smoking class. In independent test, each of the factors shows that the chisquared test between the premium selections has significant effects. This indicate that all the factors affect the insurance premium selections. For the one-way analysis of variance (ANOVA) there are significant different in insurance premium selection for each age categories and also occupation classes. Next, the hypothesis testing is performed for insurance premium selection based on gender and smoking status. The result shows there's a significance difference in insurance premium selection according categories and occupation classes. In regression analysis, all the factors such as gender, age and occupation class are significant except smoking status. The value adjusted R squared is 0.145 indicates that only 41.5% of the factors that contribute in the insurance premium selection.

Finite Element Method in Two-Dimensional Heat Equation
Nur Ain Farisha Binti Mohd & Dr Yeak Su Hoe

This research is to study the problem of two-dimensional regular geometry heat transfer equation by applying numerical method which is Finite Element Method (FEM). FEM is widely known in handling complex problems and geometries as this method is efficient in solving line integral on the boundary of the problem. This method is an approximation to its solution with high accuracy and produce stable solutions. The FEM's calculation is coded in MATLAB which is corresponding for converting the weak form into linear system. The outcome solution from FEM are compared with another numerical method which is Finite Difference Method (FDM) in order to study their accuracy. FDM's problems is suitable for regular geometry with less complexity. The obvious difference between these methods lies on their error function gained from comparison with exact solution. In generally, FEM's solution is more accurate compared to FDM.

Topological Test Space of Non Polar C_{EEG} and Ability Test in Epilepsy

Nur Alya Binti Aminuddin & Dr. Amidora Binti Idris

This study is about mathematical foundation of Topological Test Space of Non Polar C_{EEG} (NPC_{EEG}) and Ability Test in Epilepsy (ATIE). NPC_{EEG} was successfully developed for evaluating, revealing and display brain electrical activity distributed over the scalp for epileptic patients. Mathematical presentation and visual interpretation of the EEG signal during seizure is presented in this study. On the other hand, Ability Test in Epilepsy (ATIE) is a psychometric test to identify the epilepsy patients' types of intellectual ability based on the Howard Gardener's eight intelligences. These two distinct models can be placed in a common platform namely Topological Test Space. To establish these integrated models, mathematical foundation and related theorems of this Topological Test Space were investigated and discussed. Furthermore, relationship between seizure patterns (from NPC_{EEG}) and mental abilities (from ATIE) of epileptic patients were successfully identified. From these two models, there is a possibility that the active part of the brain during epileptic seizures occurred in the same part of the brain obtained from psychometric test.

A NON-DIMENSIONAL ANALYTICAL SOLUTION OF LAPLACE EQUATION ON A GAS FLOW IN GRAIN STORAGE

NurAsyiqin binti Mohd Nasarruddin & Dr Zaiton Mat Isa

In grain industry, pests or mold could cause contamination and reduce the grain quality. Therefore, for grain protection, phosphine gas has been introduced into the grain storage to eliminate insect and pests. This thesis investigates the behavior of the gas flow in an open cylindrical storage during a process known as grain fumigation. The flow of the phosphine gas was modeled as a gas flow in porous medium that satisfy Darcy's Law which later contribute to the development of Laplace Equation. The non-dimensional analytic solutions developed from Laplace equation are derived for pressure and velocity. It was found that the advection of the gas is low at the upper grain storage area where the pressure value is almost the same as atmospheric pressure align with low velocity flow. In particular, the dispersion of gas is high at the inlet and becomes lower as the vertical line (height) and horizontal line (radius) of the storage increase. For instance, the growth of pests and mold are more likely to occur at the area that have less or no fumigant dispersion.

The Mutiplicative Degree of All NonabelianMetabelian Groups of Order 16
Nur Athirah binti Jaafar & Dr. Nor Muhainiah binti Mohd Ali

The commutativity degree of a finite group G is the probability that a pair of elements, chosen randomly of G commute. The concept of commutativity degree has been extended to the relative commutativity degree of a subgroup H of G which is defined as the probability that a random element of a subgroup H, commutes with another random element of a group G. In this research, further extension of relative commutativity degree which is the multiplicative degree of a group G where it is defined as the probability that the product of a pair of elements chosen randomly from a group G, is in H, is used. This research focuses on cyclic subgroups of nonabelianmetabelian groups of order 16. Thus, the objective of this research is to determine the multiplicative degree of nonabelianmetabelian groups of order 16.

Graduates Employability Using a Non-Parametric Approach

Nur Azlin binti Ahmad & Dr Zarina binti Mohd Khalid

Graduates employability is an important indicator of academic quality at tertiary level. One way to measure the graduate's employability is by observing the length of time graduates get their first employment after their study ends. The observed time can be influenced by many factors. In this study, the observed time or the time-to-employment are being analyzed using a non-parametric Kaplan Meier approach. Three factor are being considered in this study, which included courses, grade and gender. A sample of 271 Faculty of Science graduates who graduated on October 2015 are being used in this study. Result indicated that only grade has significantly contributed to different employment experience amongst Faculty of Science fresh graduates in 2015. This implies that different grades will give different effects on the time taken for graduate's employability. Graduates who have achieved a First Class tend to be employed faster than their peers who obtained cumulative grade point average less than 3.5.

SCHRODINGER EQUATION OF ELECTROMAGNETIC WAVE TO PREDICT THE SILICON NANOWIRE GROWTH
Nur Edrina Fazleen binti Mohamed & Prof Madya Dr. Norma Alias

Numerous researches have been focusing their studies on visualizing the growth of silicon nanowires(SiNWs) through experimental data. In nanotechnology research, properties of nanowires are highly sensitive to heat transfer and growth of the temperature. Thus an experimentally challenging issue is to optimize several parameter identification during nanowire growth. This research has been proposed to visualize the growth of SiNWs. Some independent and dependent parameters impact of the SiNWs growth will be classified. Au has been used as catalyst material in predicting the growth of SiNWs. Based on the experimental data obtained, the length of SiNWs has been fixed as a constant parameter which is $5\mu m$ while diameter investigation is between 20 and $120nm$. In this study, we will observe and predict the growth by visualizing the SiNWs through one-dimensional partial differential equation (PDE) model of Schrodinger equation. For understanding the PDE model, some concepts of discretization of finite difference method (FDM) and simulation of sequential algorithm based on different iterative schemes; Jacobi and Gauss-Seidel are used. These methods are implemented using Matlab version R2011a. The validation of experimental results and numerical performance will be analyzed in terms of tolerance, run time, iteration number and root-mean-square error (RMSE). Graph visualization, table form comparison results are the indicators to validate and verify the experimental data, PDE model and numerical analysis for obtaining an alternative method of the SiNWs growth.

The Analytical Solution to the Laplace Equation of a Gas Flow in Stored Grain

Nur Farah Natasha Binti Ahmad Tamizi & Dr. Zaiton Mat Isa

In grain industry, the existence of insects leads to the contamination of the grain. To reduce these problems, phosphine gas is introduced to the stored grain during a process known as fumigation. This thesis studies the gas flow in cylindrical stored grain during that process. The thesis begins by developing mathematical model based on the Darcy's flow in porous medium which at the later produce the Laplace Equation. The Laplace equation is then solved for pressure and velocity of the gas. Based on both gas pressure and velocity equations, the gas distribution are analyse and presented on contour plot based on its height and radius by using Matlab software. The finding shows that the gas distribution is high at the inlet. However, as it moves towards the wall of the stored grain, the distribution of gas drops dramatically. In addition, the gas moves towards the atmospheric pressure as the height of the stored grain increase. For gas velocity distribution, the graph indicates the sinusoidal rate as the height of the silo increases. This trend is due to the relationship of Darcy's flow equation. Furthermore, over the radius of silo, the graphs show that the gas velocity is decreasing. The insects' growths are more likely to occur in areas with less or no dispersion of gas fumigant. Therefore, the area close to wall is at high risk of having alive insects.

A Numerical Treatment of an Exothermic Reaction Model with Constant Heat Source in a Porous Medium

Nur Farahain Binti Mohamad & Tn Hj Hamisan Bin Rahmat

Fluid behaviour simulation in the underground needs the flow patterns and concentration profiles. In this situation, exothermic reaction models in porous medium can be described that requirement. The model is focused on the driving force problem which due to the temperature and concentration gradients at the system boundaries. The numerical computation of conduction solutions is presented in this research. The governing equation is the steady-state energy balance equation of the temperature profile in conduction state with constant heat source. Finite difference and shooting methods is proposed to solve the equation. Result indicated that finite difference method is better than shooting method to solve this problem.

Parallel Boundary Element Method for Solving 2D Poisson's Equation

Nur Farahin Binti Abd Razak & Dr. Yeak Su Hoe

The solution of Poisson's equation is a fundamental for many problems of engineering and science studies. Boundary Element Method is widely used for solving boundary value problems as it is a semi-analytical method and thus provides a more accurate solution. In this study, the solution of two-dimensional Poisson's equation is presented using the Boundary Element Method via the formulations of the Boundary Integral equations. The domain integral that appears in the Boundary Element Method is solved numerically using Gaussian quadrature. Fortran programming code is developed for the problem discussed and is further parallelized. As far concerns, a huge dimension of linear system will increase the computational time and thus, the parallel algorithm is carried out to reduce the computational time as well as to increase the speedup time. The resultsin the serial Boundary Element Method are validated with the exact solution as well as the parallel Boundary Element Method. Numerical computations show the speedup in parallel Boundary Element Method. It is recommended that fast multipole method will be incorporated in parallel Boundary Element Method in the future.

Runge-Kutta Method

NurFathiah bt Mohd Sakiam & PM Dr Munira Bt Ismail

The mathematical modelling of many problems in fields of engineering and science gives rise to initial value problem (IVP). However, the exact or analytical solution are limited. Thus, a numerical method is needed to obtain an approximate solution. Among the available numerical methods for solving IVP is the popular Runge-Kutta (RK) methods. Hence, this researchis on the explicit RK methods showing the derivation of the second and fourth-order classical methods. The stability region of the methods and error estimates are described. Here, the RK methods for the numerical comparison are fourth-order classical method, Merson's method, Scraton's method and England's method to illustrates the accuracy of between these methods. MATLAB programming is used to compute the solution.

Investigation of Daily Rainfall Data to Identify Trends in Rainfall Amount and Rainfall-Induced Agricultural Events in Kedah, Malaysia
Nur Ibrahima Binti Shamsuri & En. Muhammad Fauzee Hamdan

The purpose of this study is to investigate the daily rainfall data in identifying trends for agricultural events in Kedah, Malaysia. Rainfall distribution throughout Peninsular Malaysia varies from one region to another, depending upon the direction of the moisture-bearing winds and the location of the mountain systems. The daily rainfall data obtained from five rain gaugesin different stations which are Kroh, Pendang, Sik, AlorSetar and AmpangPeduwithin a 33 years period (January 1975 - December 2007). The methods usedare Excel, SPSS, Minitab and Mann-Kendall Test to identify the trends of rainfall for annually and monthly. Besides, the methods used are to findall the sum, the mean, the average covered daily, monthly and annually also to determine on how the rainfall deviation (mm) from long term in each stations. At the end of the study, Mann-Kendall test shown that for overall annually rainfall amounts at all five stations seems not enough evidence to determine there have upward and downward trend. Instead of that,Sik and AmpangPedu have shown the same results that there have upward trend for the average number of annual rainy daysand downward trend for the average number of annual non-rainy days. Besides, the trends are clearly shown that there is enough evidence to determine that there is an upward trend at all five stations for overall monthly rainfall amounts. In addition, all five stations seem to have upward trend for the average number of monthly rainy days and downward trend for the average number of monthly non-rainy days. Thus, the results for this study may be useful for farmers and stakeholders for the next few years that contribute to a better assessment of crop that suited to agriculture in Kedah.

Solving Second Order Initial Value Problem (IVP) Using Picard Iteration Method and Fourth Order Runge--Kutta Method

Nur Rabiatuladawiyah binti Zulkepli & Dr. Shazirawati bt Mohd Puzi

Initial Value Problem (IVP) is an ordinary differential equation together with a specified value, called the initial condition, of the unknown function at a given point in the domain of the solution. In real applications, the solution to the IVP is not easy to be analytically determined. Therefore, the purpose of this research is to present the numerical solution to the second order IVP. There are two methods discussed in this study, which is Picard Iteration method and Fourth Order Runge-Kutta method. Manual calculations are conducted to obtain the solutions, and hence are compared and discussed for their strength and weaknesses.

SOLVE THE INVENTORY ROUTING PROBLEM BY GENETIC ALGORITHM

Nur Suhaila Binti Adam & Dr. Nur Arina Bazilah Binti Aziz

Inventory routing problem considerwhen inventory control and the problem of route is occurring simultaneously. In this study, one-to-many distributionnetwork that consisting depot, and an assembly plant to transport the goods into the geographically dispersed retailer to fulfill the demand in each period is focused.The un-split delivery problem is addressed. The retailer isarranging in order by the double sweep algorithm to get the initial routes. Thegenetic algorithm is proposedespecially to solve the large data with three-differences number of generation and need to run five times. The purpose of the method is to examinethe convergence of genetic algorithm in finding the total objective for inventory routing problem. The computational resultis used to solve both of the method.

Numerical Solution of One-Dimensional Signalling Transduction in the Invadopodia Formation

Nurfarahida Azwani Bt Mohd Fazllah & Dr Mohd Ariff Bin Admon

Invadopodia are sub-cellular structure found in invasive cancer cells that were uniquely formed on the membrane of metastatic cells. Formation of invadopodia involves the coordination of several cell biological processes. The binding of ligand and epidermal growth factor receptor (EGFR) activates the signalling transduction for actin branching and matrix metalloproteinases (MMPs) regulation. In this study, we considered mathematical modelling for one-dimensional Stefan-like problem of the signal process in an individual's cancer cell invasion. A model that trails the free boundary behaviour is investigated by using fixed domain method (FDM). FDM introduces a variable transform in order to fix the computational free space domain, $0 \leq x \leq s(t)$ to the new fixed space domain, $0 \leq y \leq 1$. This transformation locates a moving front, $s(t)$ on a given mesh point at the boundary-end, $y = 1,$ where y is the transformation space variable for domain x. Our results for Stefan problem showed a good agreement with the exact solution and the previous results obtained by Caldwell and Kwan, 2004. Hence, we simulated the Stefan-like problem for the free boundary positions and the signal distributions.

The Multiplicative Degree Of All NonabelianMetabelian Groups Of Order Less Than 24 Except 16

Nurfarhani binti Mustafa & Dr. Nor Muhainiah binti Mohd Ali

A group G is metabelian if there exists a normal subgroup A in G such that both $A$and the factor group, G/A are abelian. Equivalently, G is metabelian if and only if the commutator subgroupis abelian. Meanwhile, the commutativity degree of a group G is the probability that two randomly selected elements of the group commute. The concept of commutativity degree is extended to the multiplicative degree where it is defined as the probability that the product of a pair of elements x and y chosen randomly from a group G, is in a subgroup $H$of G. The main objective of this research is to determine the multiplicative degree of all nonabelianmetabelian groups of order less than 24 except 16.

Numerical Approaches in Solving Nonlinear Pendulum
Nurhanisa bt Ahmad Fadzil &PM Dr Munira Bt Ismail

Real life problems can be illustrated by mathematical modelling in order to solve the problem arise. As there are problems involving higher order initial value problem which may be more difficult to be solved exactly, this study has focused on solving a nonlinear second order initial value problem by numerical approaches where it is applied to pendulum. Here, the higher order initial value problem will be reduced to a system of first order initial value problem. Then, two numerical methods are used to solve the system and they are trapezoid rule and Runge-Kutta method of order three. Results are compared illustrating that the Runge-Kutta method provides better accuracy.

The Probability That An Element of Metabelian Groups of Order 12 Fixes
A Set and Its Generalized Conjugacy Class Graph
Nurhidayah binti Zaid & Prof. Dr. Nor Haniza Sarmin

The probability that two random elements in a group commute is called the commutativity degree. In 1973, a method to compute the commutativity degree by using the number of conjugacy classes is introduced. In this research, an extension of the commutativity degree, namely the probability that an element of a group fixes a set Ω, is determined. The groups that have been considered are nonabelianmetabelian groups of order 12, which are the dihedral group D_6, the alternating group A_4 and the semidirect group, $T = \mathbb{Z}_3 \rtimes \mathbb{Z}_4$. The set Ω considered in this research is the set of pairs of all commuting elements of the group of size two that is in the form of (x,y), where lcm $(|x|, |y|) = 2$. In this research, the probability that an element of the nonabelianmetabeliangroups of order 12 fixes the set Ω is computed under the conjugation action. In the second part of the research, the results are then applied into graph theory, namely the generalized conjugacy class graph. Some properties of the graphs which are the chromatic number, the independent number, the clique and the dominating number are also found for each graph.

Finding Global Minimization using Tunneling Method

Nurrul Wahida binti Mohd Mustafa & PM. Dr Rohanin Ahmad

The purpose of this research is to finds point with the lowest functions values which are called global minimizers. Many researchers have developed methods to solve optimization problem to find the best value in order to optimize cost and profit. This type of problem appears in many fields including business, transportation, finances, telecommunications and also in engineering. Tunneling Method together with Newton Method were chosen in this study to find the global minimizer. This research considers the performance of the classical tunneling function with different values of pole strength and initial points. The developed Tunneling Algorithms was coded in MATLAB for classical tunneling function. Three test functions were used, and the results obtained was compared and analyzed.

LINEAR PROGRAMMING AND GENETIC ALGORITHM APPROACH FOR PERSONNEL ASSIGNMENT MODELLED AS TRANSPORTATION PROBLEM

Nurul Ain binti Alzafry Mohamed Alnassif & Dr. Zaitul Marlizawati binti Zainuddin

Personnel assignment is an important problem in industry. In this study, the assignments of Takaful Specialists to jobs that will minimize the total distance travelled are to be determined. This personnel assignment problem is modelled as Transportation Problem since each personnel can be assigned to more than one jobs. Linear Programming (LP) and Genetic Algorithm (GA) are two approaches considered in this work for solving the resulting transportation problem. In the Linear Programming approach, LINGO and Excel are used in solving the LP model to obtain the exact solution. Genetic Algorithmis taken as another alternative solution approach in this study since it is proven to be very successful for NP-hard optimization problems.Sensitivity analysis is carried out to observe the changes in the optimal solution given changes in the maximum number of job assigned to the specialists. From this study, we found that Genetic Algorithm can generate a near optimal solution and the performance can be improved by improving the parameters used.

Traveling Salesman Approach for Solving Visiting Route by Using Simulated Annealing

Nurul Ain bt Norazmi & En. Wan Rohaizad bin Wan Ibarahim

This research presents an attempt to solve a student's problem in the University to travel in seven states in Malaysia, which is Johor, Melaka, Negeri Sembilan, Selangor, Wilayah Persekutuan, Pahang and Terengganu. This traveling system is formulated as a Traveling Salesman Problem (TSP). TSP involves finding an optimal route for visiting areas and returning to point of origin, where the inter-area distance is symmetric and known. This real world application is a deceptive simple combinatorial problem and our approach is to develop solutions based on the idea of local search and meta-heuristic. As a standard problem, we have chosen a solution which is deceptively simple combinatorial problem and we defined it simply as the time spends or distance travelled by salesman visiting n cities (or nodes) cyclically. In one tour the students visits each area just once and finishes up where he started. As standard problems, we have chosen TSP with different areas visited once. This research presents the development of solution engine based on local search method known as Simulated Annealing as the initial solution and further use to improve the search and provide the best solution. A user friendly optimization program developed using Microsoft C++ to solve the TSP and provide solutions to future TSP which may be classified into daily or advanced management and engineering problems.

A Method Of Calculation Of Eigenvalues Of Some Class Integral Operators

Operators

Nurul Atiqah bt Talib & Assoc Prof Dr Mukhiddin Muminov

This research are generally about the eigenvalue problem of the one dimensional Fredhlom integral operators with some kernels, where thekernel depends on the difference of variables. Within this research, we construct the mathematical model with calculation of non-zero eigenvalues and corresponding eigenfunctions. We alsogive a several examples of Fredhlomintegraloperatorswith degenerate kernel and find its nonzero eigenvalues and corresponding eigenfunctions. To solve an eigenvalue problem for general case, firstly, we present the given kernel in the series form and solve corresponding eigenvalue problem. By applying the obtained results, we solve an eigenvalue problem of the integral operator with Neumann kernel, appearing in the boundary value problems and Reimann-Hillbert problems with circular region. Using obtained model, we construct an algorithm of calculation of nonzero eigenvalues and eigenfunctions of considering operator. We construct a programming for solving the eigenvalues of Fredhlomintegraloperators and other several examples in Maple 12 software.

Trend Analysis of Streamflow in Johor using The Mann-Kendall Test and Theil-Sen Estimator

Nurul Fatin bt Ab. Azid & Dr. Norazlina bt Ismail

Streamflow is one of the factors that contributed in the study of water resource management, droughts and floods. This studyis mainly about the using of the long-term streamflow data to identify its trends to see whether it is significant upward or downward streamflow. The streamflow data of the selected four river station in Johor areSg Johor, SgKahang, SgSayong and SgLenggor. The collected data were taken from the Department of Irrigation and Drainage records. Trends and slopes are tested for significance using the Mann-Kendall trend test and Theil-Sen estimator respectively. The data used for trend analysis are the average annual streamflow and the average monthly streamflow. The results obtained portray that all of the stations show a significant downward streamflow throughout the years with *p*-value less than 0.05 for both annual and monthly trends. The regional hydrological studies and water management could use this valuable information of this distribution pattern for further research.

Fourier Transform and its Application

Nurul Huda bt Muhd Yusof & En Che Lokman bin Jaafar

Fourier transform is an extension from a Fourier series since Fourier series is limited to periodic function only but Fourier transform can be used for a larger class of function not only periodic function. This research investigates the conceptual of this transform, its properties and application. Precise definition of Fourier transform is important for clear understanding. Derivations of Fourier transform from Fourier integral using even and odd function and complex exponential also discussed. The objectives of this study to carry out analysis of Fourier transform properties in solving problem. Fourier transforms properties such aslinearity, scaling, shifting, time-differentiation, convolution, modulation and translation were studied and proved. Examples were also given to clarify the properties. We also include the relationship between Fourier transform and Laplace transform. Several examples are included for more understanding in solving problem.This project exposes the application towardsengineering with focus in filtering.

Z-Transform and Its Application
Nurul Izzati binti Ghazali & En. Che Lokman bin Jaafar

Z-transform is one of the discrete-time transforms and is a transformation that maps discrete time signal into a function of the complex variable z. This study investigates the conceptual development of this transform, the properties and applications of the transform. To understand this method, it is crucial to have a clear understanding on the definition of Z-transform. The objectives of this study are to understand the definition of z-transform, derive and prove the properties and identify some of the application. Several properties are included such as linearity, shifting and convolution for the ease of problem solving. Inverse of z-transform have been derived from definition through several mathematical operations. Besides, z-transform shows relationship with Laplace transform and Fourier transform. The application of solving difference equation by using z-transform is also discussed. Some examples are also included to support understanding. This study also included the application of z-transform to the analysis of Linear-Time Invariant (LTI) systems.

List Scheduling Algorithms for Solving Identical Parallel Processor in Minimizing Makespan

Nurul Izzati binti Muhammad & Dr. Syarifah Zyurina bt Nordin

This study focuses on the task scheduling problem on identical parallel processors. We consider a non-preemptive task scheduling with an objective function of minimizing the makespan. Makespan is the maximum of completion time to entire set of tasks where $C_{max} = \max\{C_i, i = 1, 2, \ldots, n\}$. The standard assumptions of the task characteristic of this study are no delay schedule and no precedence constraints are required. Moreover, all tasks are ready at time zero and no due date or deadlines is specified. An arbitrary processing time of mathematical model of Mixed Integer Linear Programming (MILP) is considered to obtain the exact solution. We address three List Scheduling Algorithm, which are Shortest Processing Time, Longest Processing Time, and First Come First Served. The MILP model has been implemented using AIMMS 4.13 software package which uses CPLEX 12.6.2as the solver for minimizing the makespan. The MILP gives the optimum result for each instance. The heuristic methods have been implemented using Microsoft Visual Studio 2010 Ultimate C++ programming. A computational experiment is conducted to examine the effectiveness of the different size problem. The computational results show that all the proposed heuristics obtain good result with the gap between optimal solutions are less than 20% even for a large data set. Longest Processing Time (LPT) is the best List Scheduling heuristic method with gap less than 2%.

Statistical and Trend Analysis of Rainfall Data in Johor

Nurul Syazwani Binti Mohammad & Dr. Norazlina Binti Ismail

Due to climate change, the pattern and trend of rainfall in Malaysia are affected. This study conducted to establish the rainfall trends of four rain gauge stations that represented different districts in Johor which are Mersing, Johor Bahru, Labis and Air Hitam. The monthly and annual rainfall data from 2005 to 2015 was obtained from Department of Irrigation and Drainage Malaysia. Graphs were constructed to show the changing trends within the months and years of the districts. Statistical analysis such as Minitab and Excel was performed to assess any significant difference among all stations within monthly and annually. Linear regression model was used to obtain the trend slope. The Mann-Kendall Test was used for the rainfall trend analysis in order to determine whether or not there have been any significant change in rainfall and discharge over this catchment. Descriptive statistics of the monthly rainfall amount for each rain gauge stations are summarized where the mean, standard deviation, range, minimum, maximum and coefficient of variation of rainfall were obtained.

Numerical Simulation of Parametric Model of Magneto-Rheological Fluid Damper

Nurziyana binti Hairudin & Prof Dr Zainal Abdul Aziz

The car's suspension system can be considered as the most important part in order to give the driver's and passengers' comfort, safe, and stable journey. Recent study has found new substance in the form ofMagneto-Rheological fluid (MR fluid)that can be added in the damper that will facilitate its effectiveness. Consequently a parametric model of equation of motion such as Bingham model has to be developed. In order to obtain an effective suspension system based on this model, all the relevant parameters involved must be taken into account. Making a prototype model by trial and error basis is time and money consuming. Therefore, one needs to simulate in deciding and reducing the constant range of certain parameters in the system. This will contribute to a better system of damper which resulted inthe use of optimal time and cost. A numerical approach can be utilized to solve the differential equation that is derived from a quarter car model. Finite difference method is used in this study and this gave a linear system that can besolved simultaneously. The results are then discussed as the car manufacturer needs to identify the best value of every parameter. The study shows thatthe values of the frictional force and damping coefficient would affect the performance of the car's suspension system.

Hankel Transform and Its Application in Solving Partial Differential Equations

Nuurul Afiqah Binti Jasni & PM. Dr. Yudariah Bt Mohammad Yusof

There are many methods that can be used to solve the problem of partial differential equationsand one of the method is by using the Hankel transform. In this research we introduce the basic concept and properties of Hankel transform. It was found that the Hankel transform is the best tool to solve the partial differential equations in cylindrical polar coordinate.This is followed by the introduction of the two-dimensionalwave equation model in cylindrical polar coordinate and its technique of solving using Hankel transform. Finally, we apply the method on several axisymmetric partial differential equations.

Modeling of The Performance of Students in SijilPelajaran Malaysia (SPM) Using Adaptive Neuro-Fuzzy Inference System (ANFIS)

Siti Haszriena Binti Taman & Dr Khairil Anuar Bin Arshad

Bahasa Melayu and History are compulsory subjects in Sijil Pelajaran Malaysia (SPM). All SPM candidates have to pass these two subjects in order to get the certification. The performance of these two subjects is reflected in the School Average Grade (GPS) for each subjects. Although many factors affecting the GPS, we are interested in finding the performance based on one factor only, namely the number of teachers needed to teach the subject. For this study, we have used SPM result of the year 2014 for several districts in Johor. Adaptive Neuro-Fuzzy Inference System (ANFIS) was employed in the study utilizing two types of membership functions, Triangle and Generalized Bell. The performance of ANFIS based on each membership functions was compared with the actual result. MATLAB software was used to assist in the computation. It was found that ANFIS with Generalized Bell membership function gives better prediction of GPS based on RMSE and MAE.

An Improvement Heuristic Algorithms for Distance-Constrained Capacitated Vehicle Routing Problem

Siti Noor Atiqah Binti Rasit & Dr Farhana Binti Johar

The vehicle routing problem (VRP) under distance and capacity constraints involves the design of a set of delivery routes which originate and terminate at a central depot after satisfying the customer demands. Each customer must be served exactly once and by one vehicle, where vehicle capacity and distance limit become the constraints of the problem. In this study of Distance-Constrained Capacitated Vehicle Routing Problem (DCVRP), an improvement heuristic algorithm attempts to upgrade any feasible solution by performing a sequence of edge or vertex exchanges within or between vehicle routes. The method focuses on swapping the initial routes by exchange the selected customer from the route to another route which will give the smallest increment of length without violating the distance and capacity constraints in order to identify the best improvement in solution. C++ numerical programming is used to code the proposed algorithm in order to solve DCVRP which involves large groups of data. Three categories of data which are cluster, random and random cluster data are being analyzed by considering different values of distance and capacity constraints. By utilizing the improvement heuristic method, the number of routes participated and the total distance travelled by the vehicles can be obtained. The computational results indicate that the proposed heuristic is able to generate the better solution. Further research should be done to improve the initial solution for DCVRP by using metaheuristics methods such as simulated annealing, tabu search and genetic algorithms.

Solving The Fractional Transportation Problem Using Transportation Algorithm And Fractional Linear Programming Method

Siti Nor Fazila Binti Mohamad & Dr Rashidah Binti Ahmad

A transportation problem basically deals with the problem, which aims to find the best way to fulfil the demand of n demand points using the capacities of m supply points. Each unit transported from a supply point to a demand point incurs a variable cost. In this study, it deals with the transportation problem of minimizing the ratio of two linear functions subject to a set of linear equations and non-negativity conditions on the variables. Three methods North West Corner Method (NWCM), Least Cost Method (LCM) and Vogel's Approximation Method (VAM) have been used to find initial basic feasible solutions for thefractional transportation model. The Modified Vogel's Approximation Method (MVAM)is then applied to the same transportation model to find itsinitial basic feasible solution and compared its result with above three methods. MVAM gives a better result compared to the other three methods. An improved Modified Distribution (MODI) method is then applied to the initial solution from MVAM to find optimal solution. Also, the fractional transportation problem is then modelled as linear fractional transportation problem of Charnes& Cooper method which is then then solved using the excel solver. Both methods give the same optimal solution for fractional transportation problem.

Blood Flow in Microcirculation Network

Siti Nor Rasyidah binti Hassan & Dr Wan Rukaida binti Wan Abdullah

This project addresses blood flow in the systemic microcirculation, which is formed bynetworks of small capillaries having diameters comparable in size to the blood cells passing through them. We solve sets of coupled nonlinear partial differential equations to describe unsteady blood flow in the arcade network. The model incorporates empirical descriptions of blood rheology in capillaries, particularly the Fahraeus effect, the Fahraeus-Lindqvist effect and the phase-separation effect. The coupled advection-diffusion equations are solved using finite-difference-based numerical methods and demonstrate the long-lived transient response of the flow through the network to inlet perturbations.

Lotka–Volterra Equations as Complex Mapping
Siti Norhidayah binti Mohd Nor & Dr. Niki Anis bin Ab Karim

Predation describes a biological interaction where predators hunt and feed on prey. Predation can be modelled with a dynamical system that contains two first–order differential equations. This system is known as the Lotka–Volterra equations. In this research, the main interest is to analyze the behaviour of the dynamical system and show the outcomes when Lotka–Volterra equations are rendered as a complex–plane mapping. This is done by visually characterizing mapped curves based on the dynamical system's parameters. A complex mapping based on the Lotka–Volterra equations was derived, representing the rate of change for predator/prey populations when where original population curve is in the form of circles of various radii. In order to observe and characterize the geometry of curves mapped from complex-plane curves via Lotka–Volterra equations, they were rendered using suitable software with varying parameters specified in the dynamical system. Varying values of single parameters, with other parameters normalized, in the dynamical system are then used to map the same set of circular population curves, and the resulting curves are rendered and characterized. Then, interactions of variation between two parameters in the system and the resulting curves are explored and characterized as well. Components from many mathematical disciplines have been applied for this research, forming a connection between complex variables and dynamical systems by implementation of the Lotka–Volterra equations as a complex mapping. Other variations of the dynamical system such as Lotka–Volterra equations for multiple species may be open for similar study.

Statistical Analysis on Effectiveness of 21st Century Learning at Secondary Schools in Muar Area for Mathematics Subject Using SPSS

Siti Rohaida binti Kamarudin & Dr. Zarina binti Mohd Khalid

Conventionally, teaching method in secondary schools has been teacher-centred. Starting from 2015, Malaysian Ministry of Education has introduced 21st century learning method to be implemented in selected secondary schools. The main objective of this learning method is to improve students' academic performance. The new learning style is interdisciplinary, project-based and research-driven. The purpose of the present study was to examine the effectiveness of 21st century learning in improving the performance of mathematics subject at secondary schools in Muar area. The analysis was done using a two-way analysis of variance (ANOVA) and was carried out using Statistical Package for the Social Sciences software (SPSS). We found that there exists a significant improvement in the mean scores of mathematics subject across most secondary schools after the 21st century learning method was implemented. Results also indicated that an interaction is present between schools and types of learning process. Generally, we may conclude that 21st century learning is more effective in improving students' academic performance, as compared to conventional teaching method, for most of secondary schools in Muar area.

Second Order Ordinary Differential Equation and Its Application in Force Vibration

Suzarina binti Ahmed Sukri & Dr. Maslan bin Osman

This report is about second order ordinary differential equation and its application in force vibration. We start the discussion with the physics terms that is involve in force vibration such as damping, resonance, beat and others. Not even that, the vibration equation will be derived through this report where it yields to two kind of vibration which are free vibration and force vibration. Both free and force vibration differs from each other where force vibration is where force is applied to the system. This vibration is governed from Newton's Second Law of Motion and also Hooke's Law. We use undetermined coefficient methods with some examples shown. The behavior of free and force vibration equation is studied and we observe the differences between those two. The behavior of both free and force vibration are shown by the graph that is plot by using MATLAB software while the value of the graph are obtain by using Microsoft Excel.

Estimation of Ruin Probability of Heavy-Tailed and Light-Tailed Distribution for Medical Insurance
Syahirah Bt Saupi & Dr. Arifah Bahar

This study is about the estimation of ruin probability for the medical insurance claims. Basically, ruin is said to occur if the insurer's surplus reaches specific lower bound. Risk of ruin is calculated based on the probability of winning or making money on a trade, the probability of losses and the individual's capital base. Ruin probability in medical insurance will be analysed by using Poison process. Data on the amount of claims for medical insurance from June 2014 until December 2014 were used for the study. The raw data is sorted into four types of diseases which are brain diseases, cancer, heart diseases and kidney related diseases. The tail of distribution is investigated and it is observed that brain diseases and kidney related diseases have light-tailed distribution while cancer and heart diseases have heavy-tailed distribution. The insurance claim distribution based on types of diseases are right-skewed. Next, an appropriate statistical distribution that best fit the insurance claims data has been investigated. The estimation of ruin probability is then being calculated by using risk process.

Forecasting Monthly Gold Price by Using Fuzzy Time Series
Tan Lay Huan & Prof. Dr. Zuhaimy Ismail

Due to the rapidly changing economy, forecasting plays an important role in our life for predicting the future events. Forecasting is a technique that is being used widely in many areas especially in economic. There are many forecasting methods in the literature such as Fuzzy Time Series, Regression and so on. This research attempts to forecast monthly gold prices using Fuzzy Time Series (FTS). The data used in this research are the daily gold prices from January 2010 to December 2011. The analysis is done by using Minitab software and Microsoft Office Excel. Mean squared error (MSE) and mean absolute percentage error (MAPE) will be used in this research to measure the performances of each method. The results generated using FTS for forecasting gold prices shows that the order 3 is the best model with MAPE at 1.75%. When comparing with the result using Chen model of order 1, the performance measure of MAPE is 2.70%. This shows that Chen model of order 3 is a better model for forecasting monthly gold prices.

ANALYSIS OF BLOOD FLOW THROUGH A CATHETERIZED STENOSED ARTERY USING *MATHEMATICA*

Tay Chai Jian & Prof. Dr. Norsarahaida S. Amin

The mathematical model of blood flow through a catheterized stenosed artery is considered.A catheter is a tube, which is used in medicine for patients who are bedridden and whose blood pressure needs to be measured and monitored continuously. Inserting a catheter in an artery is expected to alter some characteristics of blood flow such as velocity, the wall shear stressand the streamlines. The present model considers the catheter and the artery to be in an eccentric position while blood is assumed to be Newtonian.The governing equations are solved analytically by a perturbation method.The solution procedure is tedious and complicated. Mistakes can easily occur and difficult to rectify. A *Mathematica*-based package is developed to assist in the solution procedure and analysis of results. Results show that a catheter placed in an eccentric position causes the axial velocity andwall shear stress to increase.Also, a trapping bolus which is the formation of an internally circulating bolus of the fluid by closed streamlines, occurs in the region between the wall of stenosis and the wall of catheter.

Maximum Clique Problem in Social Network Analysis
Teoh Wei Kee & Prof. Dr. Shaharuddin Saleh

Social network analysis (SNA) is a set of methods to analyse social structures consisting of vertices and edges. SNA is used to visualize the relationships within the network then study the factors which influenced these relationships. The majormotivation of SNA is to give suggestions to improve current situation in relate to health, crime, sociology, marketing and many more. One of the central concept of SNA is maximum clique problem (MCP), the largest complete sub-graph in the network.Therefore, the aim of research is to determine the maximum clique in today's fast growing massive networks.Since the MCP is one of the NP-Hard problem, many efforts has been sacrificed to contribute various effective solutions for MCP.Basically, there are two kinds of approaches, exact and heuristic.This research uses greedy algorithm (GA) from heuristic categories instead of exact method due to its weakness on solving massive networks. The solution achieved by keep deleting vertex with the least degree number repeatedly until all the remaining vertices possess the same degree number. An application is created based on GA by using Microsoft Visual Studio 2010. This program can used to solve MCP on a massive scale network graphs and the solution of maximum clique is shown in graphical output through Visual C++ coding. The algorithm performs successfully when applied to random generated graphs and testing of program on the benchmark sets of Second DIMACS Challenge is carried out.

Hierarchical Clustering on United Stated of America Social Society

Wan Muhammad Afiq bin Wan Muhamad Fauzan & PM Dr Robiah Adnan

Hierarchical clustering is widely used in various fields to solve many problems and it creates a hierarchy of clusters which may be represented in the form of tree structure called dendrogram. Algorithms for hierarchical clustering are either agglomerative, in which one starts at the leaves and successively merges clusters together or divisive, in which one starts at the root and recursively splits the cluster. Here, the focus is using single linkage, complete linkage and average linkage to cluster the United States of America social survey data. Even though there exist many   measuring technique but in this thesis, the focus will be on the euclidean distance and squared euclidean distance. From the dendrograms obtained, the clusters obtained using the single linkage, complete linkage and average linkage are very similar. Thus there are no best hierarchical method among these three. The variables merged in each method is almost the same meaning that the dendrogram form are stable. The statistical package SPSS version 16.0 is used to help in the hierarchical clustering computation. The method used to define the number of clusters is the akaike information criterion and bayesion information criterion. The result from this thesis shows that the number of clusters that can be form are five, one cluster consist of 7 variables while the other four clusters consist one each. The best measuring technique used are euclidean distance because it produce the best range in agglomeration schedules.

Vibration of Circular Membranes (Wave Equations)
Wan Nur Faqihah Binti Mohd Zaki & Dr Mukheta Isa

Unlike a string which vibrates in one dimension, circular membranes vibrate in two-dimension simultaneously. The vibrations of circular membranes are given by the solution of the two dimensional wave equation. The purpose of this study is to find the solution of the vibration of circular membranes using the wave equation. Method of separation of variables and Bessel's function are used to solve wave equation and to find the solution of the vibration of circular membranes. The solution is obtained by using mathematical software, MATLAB. The solution results are being plotted for various initial conditions at different time instants. The vibrations of membranes for a number of initial conditions are presented at different time instants.

Forecasting the Exchange Rateby Using Optimized Discrete Grey Model

Wong Hua Min & Dr Ani Shabri

Exchange rate forecast play a fundamental role in nearly all aspects of international financial management. It plays an important role in helping to stabilize the economy of Malaysia and to support the growth of economic in Malaysia. Optimized discrete grey model (ODGM) were proposed to forecast the exchange rate between MYR and USD, MYR and JPY, MYR and SGD in this study. Monthly data of the currency exchange rate from January 2013 to April 2016 was being used as the original data to calculate the parameter of the three models and the predictive value are forecast for five months in this study. All the analysis of the data is done by using Microsoft Excel. The proposed model is compared with grey model (GM(1,1)) and discrete grey model (DGM) in order to obtain the best model. The comparison indicates that ODGM model has the best result and is the most suitable method for forecasting the data used in this study.

Generated Paths of Fuzzy Autocatalytic Set of Evaporation Process of a Boiler System

Zainab Mahamud & Prof. Dr. Tahir Ahmad

Graph is a mathematical structure used to model pairwise relations between object. In this report, graph is used to model anevaporation process of a boiler system. The evaporation process in the boiler system is a complex system of interactions between chemical substances. The process is represented as a dynamic graph by integrating the concept of Autocatalytic Set (ACS). It is then transformed into an omega algebra whereby all the possible paths of the evaporation process are determined. Seventeen variables are identified to represent the nodes with thirty six links to indicate catalytic relations among these nodes. A programming code of C++ is developed for the identification of these 2375 links.

Comparison between Box-Jenkins Method and Exponential Smoothing Method to Forecast Gold Prices
Zulkifli Bin Rambeli & Assoc. Prof. Dr. Ismail Mohamad

Gold is one of the most valuable commodities in the world. It is not only used to make jewelries but also as electronic connectors, investment and monetary exchange. Since gold prices are not constant, many statistical models on forecasting the price of gold have been developed. This study will compare which model between the Box-Jenkins ARIMA model and the Exponential Smoothing Model is more suitable. The Box-Jenkins and Exponential Smoothing Method is used to determine which model fits the data better. The Box-Jenkins method used was ARIMA with 1 lag differencing. The Exponential Smoothing model used was Single Exponential Smoothing and Double Exponential Smoothing Method. Data on the prices of gold were collected between February 2006 and January 2016 then analysed. For Box-Jenkins method Minitab Version 15.1.2 was used and Akaike Information Criterion was used to select the best ARIMA model. Microsoft Office Excelwas used to forecastusing Exponential Smoothing Method. The Augmented Dickey-Fuller (ADF)tests were used to confirmstationarity. Stationary testing were done using time series Excel add-ins, NumXL. Finally, the comparison between these two methods is made by comparing themean absolute percentage error (MAPE) and mean absolute deviation (MAD). Results showthat Box-Jenkins outclasses Exponential Smoothing in forecasting this data.

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