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Research Directory



*Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung*

Research Directory 2012



Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



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FOREWORD

The Faculty of Mathematics and Natural Sciences was established in 1947, as a part of University Indonesia in Bandung. It finally became FMIPA (Fakultas Matematika dan Ilmu Pengetahuan Alam) as we now know, with Institut Teknologi Bandung (ITB) charter in 1959. In the current status, FMIPA is one of the 13 faculties and schools in ITB. Its 175 permanent members are actively engaged in academic and research activities in the area of astronomy, chemistry, mathematics and physics; in basic areas, and their applications as well.

Research activities in FMIPA are carried out by its 15 research divisions, along its four traditional foundations; they are Astronomy, Chemistry cluster (Biochemistry, Analytical Chemistry, Inorganic and Physical Chemistry, and Organic Chemistry), Mathematics cluster (Algebra, Analysis and Geometry, Combinatorial Mathematics, Industrial and Financial Mathematics, and Statistics), and Physics cluster (Magnetic and Photonic Physics, Electronic Material Physics, Nuclear Physics and Biophysics, Physics of Earth and Complex Systems, and High Energy Physics and Instrumentation).

Based on the publication records of FMIPA faculty members, current trends and national priorities, in 2010, the Senate of the faculty declared four streams of research priority, without leaving behind the basic research that has been the mainstay and the backbone of FMIPA all these years. The streams are

1. Renewable and innovative energy
2. Nano sciences and material
3. Instrumentation
4. Computational Sciences

A recent acquisition of new laboratory equipments arriving in the late 2010, have been in full-operation in 2011. This includes Scanning Electron Microscope, Nuclear Magnetic Resonance Spectrometer (500 MHz), ESI-MS-TOF Spectrometer (HRMS), ESI-MS-Ion Trap Spectrometer, and X-ray Micro CT-Scan. This acquisition has put FMIPA ITB in a better position to pursue its research agenda.

This directory documents several aspects of research activities done by the faculty members of FMIPA ITB, and their output during the year 2011. In the coming years, FMIPA will continue to strive for implementing its research agenda, in order to forge its reputation in national and international scenes, while making contributions to science, to humanity and to the fulfillment of Indonesia's national needs.

Umar Fauzi, Dr. rer.nat, Prof.
Dean

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Astronomy Research Division

Faculty of Mathematics and Natural Sciences
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1
ASTRONOMY RESEARCH DIVISION

The Astronomy research group is divided into 3 subgroups Galaxy and Cosmology, Stellar Physics and Solar System.

Some of the research topics in the Galaxy and Cosmology subgroups are study of structure and dynamics of the Milky Way, distribution and evolution of galaxies, active galaxies (quasar), search for dark matter, and theoretical and observational cosmology.

Research activities in the Stellar physics subgroup covers three main topics (a) theoretical studies and numerical modeling of stellar evolution, stellar structure and atmosphere, circum stellar envelope and matter, common and peculiar classes of variable stars (close binary, pulsating, accretion disk), light curve and spectral synthesis; (b) Photometry and spectroscopy of variable stars (eclipsing binaries, Be stars, Helium stars, Am stars, cataclysmic binaries), polarimetry of Herbig Ae stars, and astrometry for orbital elements and physical parameters determination of visual double stars; (c) Development of data acquisition and processing systems, i.e. CCD-based astronomical instruments, image and data processing, data archival, knowledge-based classification of digital stellar spectra.

Some of research topics in the Solar System research subgroup are Solar physics (sunspot propagation and its relation to the solar flare, solar terrestrial relationships, high solar energetic particle), solar system physics (planetary Mars atmosphere, Titan atmosphere), near earth asteroid and dynamics and evolution of asteroids (family asteroids), orbit calculation of hazardous objects and extra solar planets.

Members

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Grants

1. M. Putra. Telaah Lanjut Mengenai karakteristik Emisi pada Keadaan A dari Spektrum Galactic Micquasar GRS 1915+105. *Hibah Bersaing Dikti*. 2011.
2. M. Putra. Sintesa Populasi Variabel Kataklimik: Efek perubahan Massa Bintang Katai Putih Sepanjang Evolusi. *Riset Inovasi KK*. 2011.
3. M. I. Arifyanto. Optical Photometry of Open Cluster in the Anti Galactic Center. *Riset Inovasi KK*. 2011.
4. M. I. Arifyanto. *Riset Program Doktor Unggulan Batch III*. 2011.

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3. T. Nakamura, B. Dermawan, F. Yoshida. Spherical preference in Shapes of sub-km-sized fast-rotating main-belt asteroids. *Publications of the Astronomical Society of Japan*, Vol. 63, 2011, ISSN:0004-6264, Japan. 2011.
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6. Aprilia, U. Lee, and H. Saio. Stability of g Models in Rotating B-type Stars. *Monthly Notices of the Royal Astronomical Society*, No. 412, pp. 2265-2276. 2011.
7. C. Kunjaya. Light Travel Effect. *Majalah Astronomi*, Vol.3, No. 1-2011, pp. 24-25. 2011.
8. T. Hidayat. Mencari Planet di Luar Tata Surya. *Majalah Astronomi* Vol. 3, No. 1-2011, pp. 8-9. 2011.

Analytical Chemistry Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



Analytical chemistry is a scientific discipline which develops and applies methods, instruments and strategies to obtain information on the composition and nature of matter in space and time. Our focus is on the development, validation and application of state-of-the-art, integrated and automated analytical methods and instrumentation, for trace analysis and speciation.

Analytical Chemistry Research Group of the Faculty of Mathematics and Natural Sciences has mission statement : Provide leadership in analytical chemistry research and education at the highest international level capable to make positive impact on the world, as well as provide supporting environment for scientific growth of each group member. The supporting environment will be created by synergy among the individual group member, supervisor, laboratory managers, senior staff and other group members.

Members

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Grants

1. A. Sulaeman. Pemisahan Unsur-Unsur Tanah Jarang Dari Mineral Monasit Bangka Dengan Teknik Membran Cair Berpendukung Hollow Fiber (HFSLM). *Insentif Terapan*. 2011.
2. I. Noviandri. Pengembangan Nanopartikel Elektrokatalis Untuk Analisis Dopamin Dalam Cairan Tubuh Dengan Elektroda Termodifikasi. *Insentif Riset Dasar*. 2011.
3. M. B. Amran. Teknik Prakonsentrasi dan Analisis Renik Ion Logam Berat pada Sampel Lingkungan Menggunakan Resin Pengkhelat Baru Polystyrene Dininybenzene-1-(2-pyridilazo)2-naptol (PSDVB-PAN) Berbasis Flow Injection Analisis (FIA). *Hibah Strategis Nasional Lanjutan*. 2011.

4. A. Sulaeman. Reconvery Neodimium Oksida (Nd_{203}) dari Pasir Monasit Bangka dengan Teknik Hollow Fiber Supported Liquid Membrane (HFSLM). *Riset Inovasi KK*. 2011.
5. M. B. Amran. Palladium Imprinted Polymer sebagai Material Fungsional untuk Pemungutan Palladium dari Biji Besi. *Riset Inovasi KK*. 2011.
6. Buchari. Sintesis Membran Zeolit Secara Hidrotermal untuk pemurnian air secara Reverse Osmosis. *Riset Inovasi KK*. 2011.
7. I. Noviandri. *Riset Program Doktor Unggulan Batch I*. 2011.
8. S. Gandasmita. Bioreaktor α -amilase Membran Komposit. *Riset Program Doktor Unggulan Batch I*. 2011.
9. Buchari. *Riset Program Doktor Unggulan Batch II*. 2011.
10. Rusnadi. Sintesis, Karakterisasi, dan Aplikasi Mikrokapsul Ca-Alginat Yang Mengandung Ligan Pyrazolone untuk Pemungutan Ion Logam Tanah Jarang. Hibah Penelitian Fundamental. 2011.

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2. I. Irdhawati, H. Tatsumi, I. Noviandri, Buchari, S. Ibrahim. Cyclic Voltammetry of Ion Transfer for Phenylpropanolamine Hydrochloride at Water Nitrobenzene Interface. *J. Chin. Chem. Soc.*, 58(3). Vol. 58, No.3. 2011.
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8. I. Noviandri, M. Mortalisa. Lignin modified carbon paste electrode for voltammetric determination of lead in soil. *International Congress on Analytical Sciences (ICAS), Kyoto*. 2011.
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13. A. Sulaeman. Pemisahan unsur-unsur tanah jarang dari pasir monasit Bangka dengan teknik membran cair berpendukung hollow fiber. *Seminar Nasional HKI, Pekanbaru Riau*. 2011.
14. M.A. Zulfikar. Studi pemisahan dan pemekatan unsur Nd dari unsur tanah jarang dengan teknik membran cair berpendukung hollow fiber. *Seminar Nasional HKI, Pekanbaru Riau*. 2011.
15. M.B. Amran. Ion-imprinted polymer untuk prakonsentrasi ion Pb(II) melalui ekstraksi-fasa padat. *Seminar Nasional HKI, Pekanbaru Riau*. 2011.
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17. T.A. Koesmawati, Buchari, A. Sulaeman, S. Ibrahim. Validasi metoda analisis total arsen dalam sampel ikan tuna dengan menggunakan hydride-generator quartz cell flame AAS. *Seminar Nasional HKI, Pekanbaru Riau*. 2011.
18. H. Rusli, S. Gandasasmita, M.B. Amran. Starch and maltose separation with cellulose acetate-silica fume membrane. *Seminar Nasional HKI, Pekanbaru Riau*. 2011.

Inorganic and Physical Chemistry Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



Inorganic and Physical Chemistry Research Group of the Faculty of Mathematics and Natural Sciences has a vision: to be an excellent research group focusing in new materials encompassing inorganic compounds, polymer, ceramics and composites. Its missions are:

1. to continuously improve Inorganic and Physical Chemistry teaching and learning;
2. to carry out research in the new materials and align the themes in the group (coordination compounds, metal oxides, catalysts, ceramic, biodegradable polymer, bio polymer, membrane, composite, corrosion and commutation) into the main focus, i.e. the fuel cells materials; and
3. to enhance collaborations with various research groups.

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Grants

1. B. Bundjali. Pembuatan Polimer elektrolit yang ramah lingkungan untuk aplikasi baterai litium serta karakterisasinya. *Hibah Bersaing Dikti*. 2011.
2. D. Onggo. Sintesis Kompleks Ruthenium sebagai material sel surya. *Hibah Pasca Sarjana*. 2011.
3. R. R. Mukti. Syntheses of hierarchically porous MFI zeolites via novel bifunctional anionic-templating route. *Hibah Fundamental*. 2011.
4. D. Onggo. Studi Kompleks Besi (II) Sebagai Material Saklar Molekuler. *Hibah Kompetensi Lanjutan*. 2011.
5. I. M. Arcana. Pemamfaatan Limbah Plastik Styrofoam untuk Bahan Plastik yang Mudah Terbiodegradasi (Biodegradable Polymers). *Hibah Kompetensi Lanjutan*. 2011.
6. Yessi Permana. Polymerizations of Pine Tress Derived -Pinene using Zr-Supported Clays: Heat Resistant Polymers From Biomass. *Hibah Kerjasama dan Publikasi Internasional*. 2011.
7. I. M. Arcana. Pengaruh Silikon Oksida pada karakteristik Membran Polimer Elektrolit Sel Bahan bakar dari Sampah Plastik Strofoam. *Riset Inovasi KK*. 2011.
8. V. Suendo. Fungsionalisasi Permukaan Oksida dengan Ligan Piridin dalam Pembuatan Film Tipis Molekul Forfirin Secara Self-Assembly untuk Aplikasi Sel Surya. *Riset Inovasi KK*. 2011.
9. Y. Permana. DFT Computation-Guided Synthesis of Catalysts for Polymerization of Low value Biomass into High Value Materials. *Riset Inovasi KK*. 2011.
10. I. Mulyani. Sintesis dan karakterisasi Senyawa Kompleks Nikel (II) Sebagai Prekursor katalis dalam Konversi Glukosa menjadi Sorbitol. *Riset Inovasi KK*. 2011.
11. D. Onggo. Sintesis Kompleks besi (II)-SCO dalam Polimer BC (Bacterial Cellulose) untuk material Sensor. *Riset Inovasi KK*. 2011.
12. Ismunandar. Structure And Ionic Conductivities of BIGavOX. *Riset Inovasi KK*. 2011.
13. C. Linaya. Sintesis Membran Poliblend Kitosan Suksinat Kitosan untuk Fabrikasi MEA pada Direct Methanol Fuel Cell. *Riset Inovasi KK*. 2011.
14. Ismunandar. Sintesis dan karakterisasi Elektrolit Padat Baru $(\text{CaO})_x(\text{ZnO})_y(\text{Bi}_2\text{O}_3)_{1-x-y}$ Untuk LT-SOFC. *Riset Ikatan Alumni*. 2011.
15. R. R. Mukti. Conversion of natural Zeolites into Slective type Zeolites by Continuous seeded-assisted synthesis route. *Riset Ikatan Alumni*. 2011.
16. Ismunandar. *Riset Program Doktor Unggulan Batch II*. 2011

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1. D. Onggo, J. A. Real, I. Mulyani, I. Syahbanu, and M. Aminah. The Study of Thermal Spin Crossover tris-amino triazole iron(II) Complex in a Natural Biopolymer Nata de coco. *XXIII International Conference on Coordination and Bioinorganic Chemistry (ICCBIC)*. Bratislava, Slovakia, 5-10 June 2011.
2. R. R. Mukti, Y. Kamimura, W. Chaikittisilp, H. Hirahara, A. Shimojima, M. Ogura, KK. Cheralathan, S.P. Elangovan, K. Itabashi, T. Okubo. Hierarchically porous ZSM-5 Synthesized by Nomionic and Cationic Templating Routes and Their Catalytic Activity in Liquid Phase Esterification. *ITB Journal of Science*. Vol.34A. 2011.
3. S. Triwahyono, A. A. Jalil, R. R. Mukti, M. Musthofa, A. N. Razali. Hydrogen Spillover behavior of Zn/HZSM-5 Showing Catalytically Active Protonic acid sites in the isomerization of n-pentane. *Applied Catalysis A: General*. 407. 91-99. 2011.
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5. Zulhadjri, B. Prijamboedi, A. A. Nugroho, N. Mufti, A. Fajar, T. T. M. Palstra, Ismunandar. Aurivillius phases of $\text{PbBi}_4\text{Ti}_4\text{O}_{15}$ doped with Mn_3 synthesized by molten salt technique: Structure, dielectric, and magnetic properties. *Journal of Solid State Chemistry* 184, 1318. 2011.
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8. I. M. Arcana, Bundjali, Hasan, Zulfikar, Hariyawati. The Effect of the soft segment of prepolymers on properties of poly(urethane-ester) end its biodegradability. *Polymer International*. 2011.
9. S. T. Gonggo, I. M. Arcana, C. L. Radiman, B. Bundjali. Synthesis and Characterization of Polyblends from Sulfonated Polystyrene Lignosulfonate as Ionomer Membranes. *International Journal of Materials Sciences*. 2011.
10. F. Rahmawati, Prijamboedi, Soepriyanto, Ismunandar. Doping calcia and Yttria into Zirconia Obtained from by product of tin concentrator to improve its ionic conductivity. *ITB Journal of Science*. 2011.
11. V. Suendo, M. Minagawa, A. Tanioka (2012). Chronopotentiometry study of a cation-exchange membrane in the presence of cationic surfactant in membrane surface vicinity. *Ionics* 18, 159-166. 2011.
12. R. R. Mukti. Development of various routes to synthesize zeolites with remarkable hierarchical pore structure. *Third World Academy of Science (TWAS)*. 2011.
13. V. Suendo, S. Viridi (2012). Ab initio calculation of UV-Vis absorption spectra of a single molecule chlorophyll a: Comparison study between RHF/CIS, TDDFT, and Semi-empirical Methods. *ITB J. Sci.* 44A(2), 93-112.

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15. Y. E. Koy, D. Onggo. Demonstrasi Penyimpanan Gas Hidrogen Untuk Pembelajaran Kimia. *Prosiding Simposium Nasional Inovasi Pembelajaran dan Sains 2011 (SNIPS 2011)*. Bandung, Indonesia ISBN 978-19655-0-4, pp. 233-236. 22-23 Juni 2011.
16. C. A. Rusmawan, I. Mulyani, D. Onggo. Analisis Kolorimetri Kadar Besi (III) dalam Sampel Air Sumur dengan Metoda Pencitraan Digital. *Prosiding Simposium Nasional Inovasi Pembelajaran dan Sains 2011 (SNIPS 2011)*. Bandung, Indonesia ISBN 978-19655-0-4, pp. 95-100. 22-23 Juni 2011.
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18. S. Wustoni, R. R. Mukti, A. Wahyudi, Ismunandar. Sintesis Mordenit Dengan Bantuan Benih Mineral Alam. *Jurnal Matematika & Sains*. 16. 158-160. 2011.

Organic Chemistry Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



Organic Chemistry Research Group of the Faculty of Mathematics and Natural Sciences has a vision: to be the Indonesia's leading research groups in chemistry, with an international reputation for academic excellence and achievement. Its missions are: to study and develop organic chemistry with many related aspects focused on acquiring biodiversity for broadening molecular diversity regarding chemical and biological potential to the human race, as well as on developing organic synthesis to develop techniques and its applications on material science and bioscience.

Members

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Grants

1. D. Wahyuningrum. Synthesis and Characterization of Ionic Liquids from Imidazole Derivatives as Green Solvent and Corrosion Inhibitor towards Carbon Steel in 1% NaCl Solution. *Riset Program Doktor Unggulan Batch I*. 2011.
2. Y. M. Syah. Isolation and biological evaluation of the metabolites from *Macaranga mappia*. *Riset Program Doktor Unggulan Batch II*. 2011.
3. D. Mujahiddin. Eksplorasi dan Sintesis Senyawa Fenolik Tanaman *Mallotus* Sebagai Zat Antioksidan. *Riset Program Doktor Unggulan Batch II*. 2011.
4. D. Mujahidin. Synthesis, conformational studies, and biological properties of 3-prenylated flavonoids. *SPIN-KNAW*. 2011.
5. D. Mujahidin. Media alternative cat organik pelapis kanvas untuk lukisan cat minyak yang ramah lingkungan (Green Art). *Riset KK*. 2011.

Publications

1. L. Zain, W.Z.W.M. Ahmat, N. Yamin, B.M. Yusof, N.I.N. Syah, Y.M. Achmad. Cytotoxic oligostilbenoids from *vatica odorata*. *Australian Journal of Basic and Applied Sciences*. 2011.
2. R. R. Mukti, Y. Kamimura, W. Chaikittisilp, H. Hirahara, A. Shimojima, M. Ogura, K.K. Cheralathan, S.P. Elangovan, K. Itabashi, T. Okubo. Hierarchically porous ZSM-5 Synthesized by Nomionic and Cationic Templating Routes and Their Catalytic Activity in Liquid Phase Esterification. *ITB Journal of Science, Vol. 34A*. 2011
3. S. Triwahyono, A.A. Jalil, R.R. Mukti, M. Musthofa, A.N. Razali Anorganik dan Fisik Hydrogen Spillover behavior of Zn/HZSM_5^- Showing Catalytically Active Protonic acid sites in the isomerization of n-pentane. *Applied Catalysis A: General*. 2011
4. N. Handayani, N. Miletic, K. Loos, S. Achmad, D. Wahyuningrum. Properties of immobilized *Candida antarctica* lipase B on highly macroporous copolymer. *Sains Malaysiana*, 40, 965-972. 2011.
5. Y. Nurlela, A.J Minnaard, S. Achmad, D. Wahyuningrum. A long chain alcohol as support in solid phase organic synthesis (Alkohol rantai panjang sebagai penyokong dalam sintesis organik fasa pepejal). *Sains Malaysiana*, 40, 977-983. 2011.
6. J. Abdurrahman, D. Wahyuningrum, S. Achmad, B. Bundjali. Synthesis of dipeptide benzoylalanylglycine methyl ester and corrosion inhibitor evaluation by tafel equation. *Sains Malaysiana*, 40, 973-976. 2011.
7. D. Kandias, B. Bundjali, D. Wahyuningrum. Curcuminoid compounds isolated from *curcuma domestica* val. As corrosion inhibitor towards carbon steel in 1% NaCl Solution. *Sains Malaysiana*, 40, 1013-1018. 2011.



Biochemistry Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



5
BIOCHEMISTRY RESEARCH DIVISION

Biochemistry research group of the Faculty of Mathematics and Natural Sciences of ITB has visions and missions as follows:

1. To be a leading research group in the field of biochemistry and molecular biology.
2. To undertake education and research which contribute to the understanding of nature and to the improvement of human welfare, in particular Indonesian society.

The midterm goals are to produce high quality graduates; to generate scientific papers; to apply research results for industrial and society need such as industrial enzymes and diagnostic kits. The long term goals are to produce a discovery or breakthrough in the field of biochemistry, patents, and enzyme industries biology.

Members

1. Rukman Hertadi, Dr., rukman@chem.itb.ac.id (Leader)
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11. Made Puspasari Widhiastuty, Dr.
12. Fifi F. Masduki, M.Si,

Grants

1. F. M. Warganegara. Ekspresi Heterolog dan karakterisasi Enzim Lipase Isolat Lokal. *Hibah Pasca Sarjana*. 2011.
2. Akhmaloka. Analisis Komunitas Mikroorganisme Eukaryot selama proses Pembuatan Kompos Manure Sapi. *Hibah Pasca Sarjana*. 2011.

3. D. Natalia. Kloning Gen KatG Mutan Isolat Isolat MDR Mycobacterium Tuberculosis dan Penentuan Struktur 3 Dimensi Kristal Proteinnya sebagai Target Molekul Penemuan Obat Baru. *Insentif Riset Dasar*. 2011.
4. D. Natalia. Kloning dan Overekspresi Gen -Amilase Baru dari Bacillus aquimaris MKSC 6,2 (Cloning and Overexpression of A Novel -Amylase Gene of Bacillus Aquimaris MKSC 6,2). *Riset Inovasi KK*. 2011.
5. Ihsanawati. Pemurnian Lipase termostabil Isolat Lokal potensial. *Riset Inovasi KK*. 2011.
6. S. Nurbaiti. Analisis Keragaman Fragmen Gen DNA Polimerase I Termostabil dari Kawah Domas. *Riset Inovasi KK*. 2011.
7. F. Madayanti. Analisis DGGE pada Dinamika Biodiversitas Arkhea Selama Pengkomposan Limbah Domestik. *Riset Inovasi KK*. 2011.
8. F. Madayanti. Ekspresi Heterolog dan Karakterisasi Enzim Lipase Termostabil Isolat Lokal. *Hibah Pascasarjana DIKTI Tahun kedua*. 2011.
9. D. Natalia. Produksi Pati Termodifikasi dari Ganyong (Canna edulis) dengan -Amilase Rekombinan Termostabil Pyrococcus furiosus (Production of Modified Starch from Canna edulis (Ganyong) Using Pyrococcus furiosus Thermostable Recombinant -Amylase). *Riset Ikatan Alumni*. 2011.
10. Rukman Hertadi. Stabilitas Struktur Lipase MNK pada Pelarut Organik Melalui Pendekatan Komputasi Dinamika Molekul. *Riset Ikatan Alumni*. 2011.
11. Akhmaloka. *Riset Program Doktor Unggulan Batch II*. 2011.
12. R. Hertadi. *Riset Program Doktor Unggulan Batch III*. 2011.
13. Z. Nurachman. Biodiesel dari alga. *Riset Unggulan DIKTI*. 2011.
14. Z. Nurachman. Produksi Lipase Sebagai Katalis Pembuatan CBE dari Minyak Kelapa Sawit. *Indofood Riset Nugraha*. 2011.
15. Z. Nurachman. Standardisasi Tepung Singkong dan Tepung Tapioka beserta Turunannya untuk Keperluan Pangan dan Perdagangan. *Indofood Riset Nugraha*. 2011.
16. Z. Nurachman. Pendayagunaan Gen α -Amylase Bacillus amyloliquefaciens ABBD untuk Produksi Pati Singkong Termodifikasi Melalui Kloning dan Overekspresi yang Efisien. *Indofood Riset Nugraha*. 2011.
17. R. Hertadi. Protein Engineering to Improve Thermostability of DNA Polymerase I ITB-1. *Riset CDRF HAKI*. 2011.
18. R. Hertadi. Studi in silico untuk penentuan reaksi konjugasi, stabilitas dan reaktivitas vaksin konjugat Thypoid-Diptheria Toxoid. *Hibah Kerma ITB-Biofarma*. 2011.
19. R. Hertadi. Desain Antena dan Studi Transfer Elektron dalam Fotosintesis Artificial. *Program Doktor Unggulan*. 2011.
20. Rukman Hertadi. Pemanfaatan cangkang telur sebagai material support amobilisasi enzim lipase. *Hibah Bersaing DIKTI*. 2011.

21. Akhmaloka. Ekspresi Endogenous dan Karakterisasi Lipase YTae3. *Beasiswa Program Doktor Unggulan IMHERE*. 2011.
22. Akhmaloka. Kloning & Karakterisasi Gen Pengkode DNA Polimerase Termotabil melalui Pendekatan Metagenom. *Hibah Doktor*. 2011.
23. Akhmaloka. Analisis komunitas mikroorganisme eukaryot selama proses pembuatan kompos manure sapi. *Hibah Pascasarjana DIKTI Tahun kedua*. 2011.
24. Akhmaloka. Biodiversitas mikroba selama pembuatan kompos manure sapi. *Hibah Bersaing DIKTI*. 2011.

Publications

1. D. Natalia, K. Vidilaseris, Satrimafitrah, Ismaya, P. Purkan, Fibriansah, Puspasari, F. Nurachman, Dijkstra, Soemitro. Biochemical Characterization of a Glucoamylase from *Saccharomycopsis Fibuligera* R64. *Biologia*. 2011.
2. Widhiastuty, Febriani, Moeis, Akhmaloka, F. Madayanti. Cloning, Homological Analysis and Expression of Lipase Gene from Hot Spring Isolate. *International Journal of Integrative Biology*. 2011.
3. Z. Nurachman, A. Kono, O. K. Radjasa, D. Natalia. Identification a novel raw strach degrading a amylase from a tropical marine bacterium. *American Journal of Biochemistry and Biotechnology*. Vol.6. 2011.
4. Z. Nurachman, S. D. Kurniasih, F. Puspitawati, S. Hadi, O. K. Radjasa, D. Natalia. Cloning of the endoglucanase gene from a *Bacillus amyloliquefaciens* PSM 3. in *Escherichia coli* revealed catalytic triad residues Thr-His_Glu. *American Journal of Biochemistry and Biotechnology*. Vol.6. 2011.
5. F. Puspasari, Z. Nurachman, A. Noer, O.K. Radjasa, M.J.E.C. Van der Maare, D. Natalia. Characteristic of raw strach degrading Amylase from *Bacilius aquimaris* MKSC 6.2 associated with soft coral *Sinulaira*. *Strach*. 2011.
6. W. Y. Rahman, E. Sarmini, Herlina, Triyanto, Hambali, A. Muthalib, A. Aziz, S. Nurbaiti. 2011. Synthesis and purification of P-32 labelled nucleotide [³²P]-ATP. *Proceeding of symposium nuclear medicine for non nuclear medicine physician-DR. Hasan Sadikin Hospital*. 2011.
7. Safika, F. Madayanti, P. Aditiawati, Akhmaloka. Amplification 16S rRNA of Methanogenic Archaeal Directly During Cattle Manure Composting. *Proceeding the 2nd International seminar on Chemistry-Jatinangor*. 2011
8. B. V. el Viera, I N. P. Aryantha, F. Madayanti, Akhmaloka. Molecular Characterization of Eukaryal Biodiversity in the Thermophilic Phase of Composting. *Proceeding the 2nd International seminar on Chemistry-Jatinangor*. 2011
9. Suharti, R. Hertadi, F. M. Warganegara, S. Nurbaiti, and Akhmaloka. Diversity of DNA polymerase I fragments from Domas Hot Spring. *Proceeding the 2nd International Seminar on Chemistry-Jatinangor*. 2011
10. H. L. Wiraswati, F. M. Warganegara. Isolation and Identification lipid from *Sargasum* sp for biodiesel. *Proceeding the 2nd International Seminar on Chemistry-Jatinangor*. 2011

11. S. F Syihab, F. M. Warganegara. Modification and molecular weight determination of local isolate lipase and the application for biodiesel synthesis from seaweed oil (*Sargasum* sp). *Proceeding the 2nd International Seminar on Chemistry-Jatinangor*. 2011
12. A. H. Permana, Akhmaloka, F. M. Warganegara. Identification of thermostable lipase from *Geobacillus lituanicus* YTae-13 isolated from Gedongsongo hot spring. *Proceeding the 2nd International Seminar on Chemistry-Jatinangor*. 2011

Algebra Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



6 ALGEBRA RESEARCH DIVISION

The mission of the Algebra group division at ITB is to pursue the Tridharma, which are providing a quality learning process in mathematics at all level, undergraduate and post-graduate, developing and extending the knowledge of algebra through research, and disseminating and applying the knowledge of algebra.

The group's program (road map) covers

1. the fundamental research with emphasis on the development of the theory of module and co-module with categorical approach:
 - (a) Research on algebras, modules, co algebras and co modules: hereditary, co hereditary, Noether, coNoether, prime, co prime properties.
 - (b) Research on category and categorification
2. the applied research with emphasis on the application of algebraic structures in control system, cryptography and other areas.

The group members are actively working in research on the following areas:

1. comodule and coalgebra, hereditary, Noether and prime (HNP) ring and module and its generalization to module HNP
2. module theory with categorical approach : abelian, triangulated and derived category
3. algebraic structures and their application in system and control theory, and cryptography

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1. Irawati, Dr., Prof., `irawati@math.itb.ac.id` (Leader)
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7. Fajar Yuliawan, ST., M.Si, `fajar.yuliawan@math.itb.ac.id`
8. Dellavitha Nasution, M.Si (on leave)

Grants

1. M.I. Detiena. Sekitar Blok dengan Grup Defect Komutatif (On Block with Abelian Defect Group). *Hibah Bersaing Dikti*. 2011
2. H. Garminia . Karakterisasi Hypergraph Intergral Pada Kelas Hypergraph $9n, r, d$ -design, Sunflower dan Hypercycle. *Riset Inovasi KK*. 2011
3. M.I. Detiena. Aljabar Nakayama dengan Mutasi (Nakayama algebras with Mutations). *Riset Inovasi KK*. 2011
4. P. Astuti. Behavior Sebagai Generalisasi Model rasional di Sekitar Pole Takhingga. *Riset Inovasi KK*. 2011
5. P. Astuti. Kajian Invariansi Sifat Gelanggang Pusat Aljabar Grup. *Riset Program Doktor Unggulan Batch I*. 2011
6. M.I. Detiena. Variety Kompleks Projektif dan Variety Polidul. *Riset Program Doktor Unggulan Batch II*. 2011
7. H. Garminia. Sekitar Modul Valuasi. *Riset Program Doktor Unggulan Batch III*. 2011
8. P. Astuti. Sekitar Modul Dedekind. *Riset Program Doktor Unggulan Batch III*. 2011

Publications

1. H. Garminia, P. Astuti, Irawati. A Note on Dedekind Modules. *International Journal of Algebra*. Vol. 5. No. 10. 2011.
2. Irawati. The Generalization of HNP Ring and Finitely Generated Modules Over HNP Ring. *International Journal of Algebra*. Vol. 5. No. 13. 2011.
3. A.K. Amir, H. Marubayashi, P. Astuti, I. Muchtadi-Alamsyah. Corrigendum to Minimal Prime Ideals of Ore Extension Over a Commutative Dedekind Domain and Its Application. *JP Journal of Algebra, Number Theory and Applications*. Vol. 21. 2011.
4. A.K. Amir, P. Astuti, I. Muchtadi-Alamsyah, Irawati. On Maximal Orders and Factor Rings of Ore Extension over a Commutative Dedekind Domain. *Far East Journal of Mathematical Sciences*. Vol. 55. No. 1. 2011.
5. T.K. Maryati, E.T. Baskoro, A.N.M. Salman, Irawati. On the Path (super) Magicness of Some Cycles with Some Pendants. 2011.
6. M. Paryasto, B. Rahardjo, I. Muchtadi-Alamsyah, Kuspriyanto. Implementasi Composite Field pada Elliptic Curve Cryptography. *Jurnal Ilmiah Ilmu Komputer* . Vol. 7. No. 2. 2011.
7. P. Astuti, H.K. Wimmer. Characteristic and Hyperinvariant Suspaces Over The Field $FG(2)$. *Linear Algebra and Its Applications*. 2011.
8. Irawati, Purboyo TW. Developing Computer Program for Computing Eigenpairs of 2×2 Matrices and 3×3 Upper Triangular Matrices Using the Simple Algorithm. *Far East Journal of Mathematical Sciences*. 2011.

9. P. Astuti, A.N.M. Salman, H. Garminia , Irawati. The Properties of Some Coefficients of the Characteristics and the Laplacian Polynomial of a Hypergraph, *Int. Journal of Contemp. Math. Sciences*. Vol. 7, 2012, no. 21-24, 1029-1035.
10. E. Suwastika, I. Muchtadi-Alamsyah, Irawati. Polynomials over G-Dedekind Prime Rings. *Far East Journal of Mathematical Sciences*. Vol 58 Issue 2, 173-178. 2011.

Analysis and Geometry Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



At Faculty of Mathematics and Natural Sciences, Institut Teknologi Bandung, Analysis and Geometry Group ITB is considered as one of the strongest groups which has good reputation among other mathematical analysis research group in Indonesia and neighboring countries. Our mission as a part of an education institution of ITB is to guarantee the high quality of analysis and geometry courses which are run in ITB so they become references for national standard. In research field, our mission is to become a productive and synergic group who is strong in fundamental knowledge, thriving in advance one and active in the applications. In community empowerment, we also have a mission to contribute significantly in community empowerment, not only for students and academic staff in ITB but also for the community outside ITB.

The member of the group are actively working in research on the following areas:

- Operator Algebra
- Partial Differential Equations and Fourier Analysis
- Functional Analysis
- Dynamical Systems: Theory and Applications
- Integral Equations
- Delay and Impulsive Differential Equations

Members

1. Marcus Wono Setya Budhi, Dr., wono@math.itb.ac.id (Leader)
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Grants

1. J.M. Tuwankotta. Chaotic Dynamics in Hamiltonian Systems. *Riset Inovasi KK*. 2011
2. M.W. Setyabuhdi. Inversi tak Linear untuk Seismic. *Riset Inovasi KK*. 2011
3. Y. Soeharyadi. Studi Tentang Peluruhan Energi pada persamaan Modifikasi logistik. *Riset Inovasi KK*. 2011
4. H. Gunawan. Topologi di Ruang Norm-n. *Riset Inovasi KK*. 2011
5. H. Gunawan. *Riset Program Doktor Unggulan Batch II*. 2011

Publications

1. M. Indris, S. Ekariani, H. Gunawan. On The Space of P-summable sequences. *Mat. Vesnik*. 2011.
2. H. Gunawan, Y. Sawano. Application of Reproducing Kernel Hilbert space to a minimization problem with prescribed nodes. *EAJAM*. 2011.
3. H. Gunawan, E. Rusyaman, L. Ambarwati. Surfaces with prescribed nodes and minimum energy integral of fractional order. *ITB Journal of Sciences*. 2011.
4. W. Setya Budhi, J. Lindiarni. Boundedness of Multilinear Generalized Fractional Integral Operators in Generalized Morrey Space. *Far East Journal of Mathematics*. Vol. 57.No. 1. 2011.
5. W. Setya Budhi, J. Lindiarni. Boundedness of the Bimaximal Operator and Bifractional Integral Operators in Generalized Morrey Spaces. *SEAMS Conference, Yogya*. 2011.
6. L.H. Wiryanto, J. Wijaya. An integral equation of a free-surface flow involving deep fluid. *Proc. Int. Conf. Numerical Analysis Optimization*. AM4. 1-AM4. 7. 2011.
7. Fatmawati, R. Saragih, B. Riyanto, Y. Soeharyadi. Balanced Truncation for Unstable Infinite Dimensional system via Reciprocal transformation. *International Journal of Control Automation and Systems*. Vol. 9. No. 2. 2011.
8. Wiryanto, L.H., Widjaja, J., Supriyanto, H.B. Free-surface flow under a sluice gate from deep water. *Bulletin of the Malaysian Mathematical Sciences Society*. Vol. 34. No.3. 2011.

Combinatorial Mathematics Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



Combinatorial Mathematics Research Group constantly conducts various research activities. These activities lead to the big theme of optimization in combinatorics and its applications. This research theme consists of research topics in extremal problems, random graph for the existence of large subgraphs, graph coloring, cutting sequences in number theory, combinatorial designs, Ramsey numbers, and their applications in real problems. To support the research activities, the group has been conducting several international conferences on graph theory and related fields.

Members

1. Edy Tri Baskoro, Dr. Prof., ebaskoro@math.itb.ac.id (Leader)
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10. R.A. Desidera Kooswinarsinindyah, M.Sc., (on leave)

Grants

1. E.T. Baskoro. Dimensi Partisi Graf Hasil Operasii Korona. *Hibah Pasca Sarjana*. 2011
2. R.M.G. Simanjuntak. Dimensi Metrik dan Dimensi partisi dari Graf Hasil Operasi. *Hibah Kompetensi Lanjutan*. 2011
3. D. Suprijanto. Konstruksi Kode Swa-Dual atas grup Abelian Hingga $Z_2 \times Z_2$ dan $Z_4 \times Z_4$. *Riset Inovasi KK*. 2011
4. M. Salman A.N. Pelaelan H-Ajaib dan H-(a,d)-Anti Ajaib pada Graf. *Riset Inovasi KK*. 2011
5. E.T. Baskoro. Penentuan Bilangan Kromatik-Lokasi untuk Graf Hsail Korona. *Riset Inovasi KK*. 2011
6. D. Suprijanto. Kode Swa-Dual dari Graf Strongly Regular. *Riset Ikatan Alumni*. 2011

7. E.T. Baskoro. *Riset Program Doktor Unggulan Batch II*. 2011
8. E.T. Baskoro. *Riset Program Doktor Unggulan Batch III*. 2011

Publications

1. Vetra, R. Simanjutak, E.T. Baskoro. Large bipartite Cayley graphs of given degree and diameter. *Discrete Mathematics*. 2011.
2. Asmiati, H. Assiyatun, E.T. Baskoro. Locating-chromatic number of amalgamation of stars. *ITB Journal of Science*. 2011.
3. A.A.G. Ngurah, E.T. Baskoro, I. Tomescu. Magic Graphs with pendant edges. *Ars Combinatoria*. 2011.
4. T.K. Maryati, E.T. Baskoro, A.N.M. Salman, Irawati. On the path (super)magicness of some cycles with some pendants. 2011.
5. T. Vetric, R. Simanjutak, E.T. Baskoro. Large bipartite cayley graphs of given degree and diameter. *Discrete Mathematics*. 2011.
6. Asmiati, H. Assiyatun, E.T. Baskoro. Locating-chromatic number of amalgamation of stars. *ITB Journal of Science*. 2011.
7. M. Ba-ca, E.T. Baskoro, A.N.M. Salman, S.W. Saputro, D. Suprijanto. The metric dimension of regular bipartite graphs, *Bull. Math. Soc. Sci. Roumanie, Tome*. Vol. 54. No. 1. 2011.
8. H. Iswadi, E.T. Baskoro, R. Simanjuntak. On the metric dimension of corona product of graphs. *Far East Journal of Mathematical Sciences (FJMS)*. 2011.
9. M. Arzaki, D. Suprijanto. Note on Elementary Contructions of Self-dual codes over Z_8 . *International Mathematical Forum*. Vol. 6. No. 16. 2011.
10. D. Suprijanto. On Euclidean tight 6-designs : Experimental result. *ITB Journal of Science*. Vol. 43. No. 1. 2011.
11. A.Q. Baig, A. Ahmad, E.T. Baskoro, R. Simanjuntak. On the super edge-magic deficiency of forests. *Utilitas Mathematica*. 86 (2011), 147-159.
12. B. Ilman, D. Suprijanto. New binary self-dual codes of length 36. *Jurnal Matematika dan Sains*. Vol. 15 No 3. December 2010.
13. E.T. Baskoro, L. Yulianti. Ramsey minimal graphs for ${}_2K_2$ versus P_n . *Advances and Application in Discrete Mathematics*. 2011.
14. E.T. Baskoro, I. Apni Purwasih. The locating-chromatic number of the corona product of graphs. *Proceeding of the International Conference in Mathematics and Applications, Mahidol University*. (2011), 33-40.

Industrial and Financial Mathematics Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



INDUSTRIAL AND FINANCIAL MATHEMATICS RESEARCH DIVISION

We aim to be a center of mathematical modeling and simulation that linking industry practitioners and applied mathematicians. To this end, we provide mathematical and numerical courses focus on finance, optimization and control theory, fluid dynamics, and life sciences that are offered to any graduate and undergraduate students of ITB. Workshops and short courses on certain topic in applied mathematics are also held every year that are open for public. We also are actively involved in developing interdisciplinary networks between mathematician and other professionals or scientists in solving real-world problems using mathematical modeling. Several linkages have been developed for many years with our partner institutions. For instance, the group has collaborated intensively with Research Consortia OPPINET (Optimization on Oil & Gas Pipeline Network) and FinanMOS (Financial Modeling, Optimization, and Simulation). Both research consortia are housed in PPMS (Center for Mathematical Modeling and Simulation) ITB. For more information, please visit our website <http://ifm.math.itb.ac.id>

Members

1. Sri Redjeki Pudjaprasetya F., Dr., srpudjap@math.itb.ac.id (Leader)
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13. Roberd Saragih, Dr., Prof., roberd@math.itb.ac.id
14. Muhammad Islahuddin, M.Sc., m.islahuddin@math.itb.ac.id
15. Mochamad Apri, M.Sc., (on leave)

Grants

1. E. Soewono. Optimal Control in Disease Transmission. *Hibah Kerjasama dan Publikasi Internasional*. 2011
2. A.Y. Gunawan. Analisis Bifurkasi untuk Proses Oksidasi Gas Metan pada Reaktor Aliran Bolak-Balik. *Riset Inovasi KK*. 2011
3. L.H. Wiryanto. Integral Equation on free Surface flow from deep water. *Riset Inovasi KK*. 2011
4. N. Nuraini. Model Komprehensif Penyebaran Penyakit Demam Berdarah dalam kaitannya dengan Infeksi Virus dalam Tubuh. *Riset Inovasi KK*. 2011
5. R. Saragih. Sistem Kontrol Bilinear Berorde Minimum Melalui Reduksi Faktor Coprime. *Riset Inovasi KK*. 2011
6. E. Soewono. Model Kontrol Optimal Eradikasi Populasi Nyamuk untuk Pencegahan dan Pengendalian Penyebaran Demam Berdarah Dengue di daerah Endemik. *Riset Inovasi KK*. 2011
7. N. Nuraini. Analisis Model Pengaruh Pengendalian (Vaksinasi atau Pengobatan) terhadap Penyebaran Penyakit Menular di Indonesia. *Riset Ikatan Alumni*. 2011
8. S. Rejeki. Efektivitas serta Dampak Berbagai Bentuk Pemecah Gelombang. *Riset Program Doktor Unggulan Batch II*. 2011
9. R. Saragih. Pengembangan kontrol bilinear stokastik pada dinamika populasi. *Riset Program Doktor Unggulan Batch III*. 2011
10. S. Rejeki. Conserved numerical modeling for near shore hydrodynamics. *Riset Program Doktor Unggulan Batch III*. 2011
11. E. Soewono. Model Penyebaran Demam Berdarah dengan memperhatikan Kebocoran Plasma dalam Tubuh Manusia. *Riset Program Doktor Unggulan Batch III*. 2011

Publications

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2. Windarto, A.Y. Gunawan, P. Sukarno, E. Soewono. Modeling of Mud Filtrate invasion and damage zone formation. *Journal of Petroleum Science and Engineering*. 2011
3. E. Groesen, Andonowati. Fully dispersive dynamic models for surface water waves above varying bottom, Part 1 : Model Equations. *Wave Motion*. 2011
4. Fatmawati, R. Saragih, B. Riyanto, Y. Soeharyadi. Balanced Truncation for Unstable Infinite Dimensional system via Reciprocal transformation. *International Journal of Control Automation and Systems*. Vol. 9. No. 2. 2011
5. Miswanto, I. Pronoto, H. Muhamad, D. Mahayana. The Collective Behavior of Multi-Agents System for Tracking a Desired Path. *International Journal of Basic & Applied Sciences IJBAS-IJENS*. Vol. 11. No. 1. 2011

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7. Naiborhu, J. Trajectory following method on output regulation of affine nonlinear control systems with relative degree not well defined. *ITB J. Sci.*. Vol. 43. No. 2. 2011
8. Sumarti, N., Hidayat, R. A financial risk analysis: Does the 2008 financial crisis give impact on weekend's returns of the U.S. movie Box Office?. *IAENG International Journal of Applied Mathematics*. Vol. 41. No.4. 2011
9. Wiryanto, L.H., Widjaja, J., Supriyanto, H.B. Free-surface flow under a sluice gate from deep water. *Bulletin of the Malaysian Mathematical Sciences Society*. Vol. 34. No.3. 2011
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11. Nuraini, N., Irawan, R., Zulkifli , Soewono E. Mathematical Modeling of HIV/AIDS Transmission among Injecting Drug Users with Methadone Therapy. *Asian Transaction on Basic and applied Sciences*. Vol 01, Issued 5. pp. 10 15. 2011
12. Saragih, R. Parameters optimization of Flexible Structure Using Genetic Algorithm. *Proceeding of the 9th IEEE International Conference on Control and Automation*. 2011
13. Sumarti, N., Hidayat, R. A risk model on the weekend's returns of the U.S. movie industry. *Proceedings of the World Congress on Engineering 2011*. WCE 2011 1, pp. 211-215. 2011
14. L.H. Wiryanto, J. Wijaya. *An integral equation of a free-surface flow involving deep fluid*. *Proc. Int. Conf. Numerical Analysis Optimization*. AM4. 1-AM4. 7. 2011

Statistics Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



10
STATISTICS RESEARCH DIVISION

Members of the Statistics Research Division have diverse research interests and always aiming to give significant contributions to the needs in industries; and in other disciplines than statistics and mathematics. Cooperation with Indonesian government, industries, and other universities (national and international) have been established for decades. Members of the Statistics Research Division receive research grants among others, from Ministry of Education, from Ministry of Research and Technology and from Institut Teknologi Bandung.

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10. Bernadetta Br.Tarigan, Dr., (on leave)

Grants

1. U. Mukhaiyar. Algoritma Pemodelan GSTAR untuk Pemmasalahan Data ruang Waktu; Studi kasus pada Produksi The bulanan di Jawa Barat. *Hibah Fundamental*. 2011
2. U.S. Pasaribu. Kajian Perilaku Parameter- Parameter Model Generalized Space Time Autoregressive Orde Dua : Studi Kasus pada Produksi Bulanan Perkebunan Teh di Wilayah Jawa Barat. *Hibah Kompetensi Lanjutan*. 2011
3. S. Darwis. Identifikasi Reservoir Komposit Menggunakan Ensemble kalman Filter (Composite reservoir Identification using Ensemble Kalman filter). *Riset Inovasi KK*. 2011
4. K.I.A. Syuhada. The Coverage properties Of NIG Stochastic Volatility Models: Experience from Indonesian Stock Returns. *Riset Inovasi KK*. 2011
5. S. Darwis. Pengembangan Model Prakiraan Cadangan Minyak Bumi Pada Reservoir Komposit Menggunakan Filter Kalman (Development Oil Reserve Prediction Model for Composite Reservoir Using Kalman Filter). *Riset Ikatan Alumni*. 2011

6. U.S. Pasaribu. *Riset Program Doktor Unggulan Batch III* .2011

Publication

1. Mutaqin, S. Darwis, D. Tampubolon , Djojosugito. Estimation of Outstanding claims liability using empirical moments of correlated random sum. *International Journal of Applies Mathematics and Statistics*. 2011
2. S. Darwis, A.Y. Gunawan, A. Komarudin, N. Fitriyati. EnKF Estimation: Comparison of Analytical and Numerical Forecast Step. *Far East Journal of Theoretical Statistics JFTS*. 2011
3. S.W. Indratno, A.G. Ramm. A Collocation method for solving some integral equations in distributions. *Journal of Computational and Applied Mathematics*. 2011
4. Syuhada, K. Prediction Limit for INAR(1) Model. Int Conf "Challenges in Statistics and OR". 2011
5. Syuhada, K. Forecasting with NIGSV Model. Int Conf on Mathematical Finance and Economics. 2011
6. Darwis, S. History Matching Reservoir Parameter. Int Conf on Mathematics Statistics and Applications ICMSA 2011. 2011
7. Darwis, S. History Matching Composite Reservoir. SEAMS GMU Int Conf on Math and Its Applications. 2011

Electronic Materials Physics Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



The scopes of Physics for Electronic Material Research Group research activities are growth and characterization of electronic materials, theoretical/numerical studies of electronic material properties, and its application for electronic and optoelectronic devices. Research areas that we are interested in are divided into four major groups that are of amorphous semiconductors, compound semiconductors, superconductors and oxides, and theory and simulations. The study of amorphous semiconductor is focused on the growth and characterization of amorphous silicon and its application to some electronic and optoelectronic devices such as solar cell, thin film transistor for flat panel display, light emitting diode, and color sensor. The a-Si:H, a-SiC:H, a-SiN:H, a-SiGe:H, c-Si:H, poly-Si, and CNT (carbon nano-tube) have been resulted in this field. In another field, the study of compound Semiconductor is focused to III-V compound semiconductor and their related materials, such as gallium, nitrate, and antimony based compound semiconductors. These deposited materials have been applied to various electronic devices such as ultraviolet and infrared detectors, gas sensor, laser diode, FET, and MOSFET. It has also been successful grown the quantum-dot GaN type.

Different with two above fields, the study of superconductor and oxides is focused to superconductors, ferroelectric, and pyroelectric materials investigation. Research on superconductor is directed to thin film high critical temperature superconductor, particularly YBCO, NBCO, HgSnBCCO, and their application in electronic devices. The NdCeO₂ material for solid electrolyte fuel cell application has also been studied in this field. While, the study of theoretical and simulation is specialized to investigate the electronic material properties through theoretical analysis using computer simulation and its probability usage to experimental process of electronic devices.

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11. Ariando, Dr., (on leave)

Grants

1. M. Abdullah. Fabrikasi BCNO Phosphor material untuk Aplikasi Lampu LED Putih. *Hibah Pasca Sarjana*. 2011
2. Khairurrijal. Pengembangan Instrumen Berbasis Mikrokontroler untuk Mengkarakterisasi Material Feroelektrik. *Riset Inovasi KK*. 2011
3. M. Abdullah. Pengembangan Reusable water Filter dari Nanopartikel Titanium Dioksida. *Riset Inovasi KK*. 2011
4. Khairurrijal. *Riset Program Doktor Unggulan Batch I*. 2011

Publications

1. E. Widiatmoko, Widayani, M. Budiman, M. Abdullah, Khairurrijal. A Simple Spectrophotometer Using Common Materials and a Digital Camera. *Physics Education* .Vol. 46. 2011.
2. Khairurrijal, M. Abdullah, M. Budiman. B6:B16ome-made PIC 16F877 Microcontroller-based Temperature Control System for Learning Automatic Control. *Computer Applications in Engineering Education* .Vol. 19.No. 1. 2011.
3. W.-N. Wang, T. Ogi, Y. Kaihatsu, F. Iskandar, K. Okuyama. Novel rare-earth-free tunable-color-emitting BCNO phosphors. *Journal of Materials Chemistry*. Vol. 21.No. 14.2011.
4. A.B.D. Nandiyanto, T. Ogi, F. Iskandar, K. Okuyama. Highly Ordered Porous Monolayer Generation by dDal-speed spin-coating with Colloidal Templates. *Chemical Engineering Journal* .Vol. 167.No. 1.2011.
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6. R. Balgis, F. Iskandar, T. Ogi, A. Purwanto, K. Okuyama. Synthesis of Uniformly Porous NiO/ZrO₂ Particles. *Materials Research Bulletin*. Vol. 46.No. 5.2011.
7. N. Hagura, T. Ogi, T. Shirahama, F. Iskandar, K. Okuyama. Highly Luminescent Silica-coated ZnO Nanoparticles Dispersed in an Aqueous Medium. *Journal of Luminescence*. Vol.131 No. 5.2011.
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9. Masturi, M. Abdullah, Khairurrijal. High Compressive Strength of Home Waste and Polyvinyl Acetate Composites Containing Silica Nanoparticle Filler. *Journal of Materials Cycles and Waste Management*. 2011.
10. V. Isnaeni, O. Arutanti, E. Sustini, H. Aliah. A Novel System for Producing Photocatalytic Titanium Dioxide-coated Fibers for decomposing Organic Pollutants in Water. *Environmental Progress (Wiley)*. 2011.

11. Khairurrijal, M. Abdullah, M. Budiman. Home-made PIC 16F877 Microcontroller-based Temperature Control System for Learning Automatic Control. *Computer Applications in Engineering Education*. 2011.
12. Suryamas, A.B. Munir, M.M., Ogi, T., Khairurrijal, Okuyama. Intense green and yellow emissions from electrospun BCNO Phosphor nanofibers. *Journal of Materials Chemistry*. 2011.
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20. Bebeh W. Nuryadin, Irfana Diah Faryuni, Ferry Iskandar, Mikrajuddin Abdullah, and Khairurrijal. Effect of Silica Nanoparticles on the Photoluminescence Properties of BCNO Phosphor. *AIP Conference Proceedings*, Vol. 1415 (2011), pp. 171-174. 2011.
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24. Menik Ariani, Zaki Suud, Abdul Waris, Khairurrijal, Fiber Monado. Design of Small Gas Cooled Fast Reactor with Two Region of Natural Uranium Fuel Fraction. *International Conference on Physics and Applied Physics*. 2011.
25. Mitra Djamal, Ramli, Freddy Haryanto, Khairurrijal. Chapter 6. GMR Biosensor for Clinical Diagnostic. Buku berjudul *Biosensors for Health, Environment, and Biosecurity*, P. A. Serra (Ed.), (Rijeka, Croatia, Intech, 2011), pp. 149-164.2011.

Theoretical High Energy Physics and Instrumentation Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



THEORETICAL HIGH ENERGY PHYSICS AND INSTRUMENTATION RESEARCH DIVISION

Theoretical High Energy Physics : Fock-Schwinger, teleparallel gravity, Chern-Simon Theory, extra dimensional super gravity and superstring; extra dimensional braneworld and super gravity domain walls; braneworld gravity and geometric flow; extra dimensional geometric flow; super gravity on Ricci flow; deformation of M Theory; integrable and dynamical systems.

Instrumentation: Development of new sensors especially high resolution magnetic sensors based on fluxgate and giant magneto resistance (GMR) material, biosensors, smart home, mobile robot, digital signal and image processing, material science computation, instrumentation for education

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12. Maria Evita, M.Si.,

Grants

1. M. Djamal. Pengembanagan Material Giant Magnetoresistance (GMR) baru Berbasis material Organik. *Hibah Kompetensi Lanjutan*. 2011
2. B.E. Gunara. Dinamika BPS Domain Walls dalam $N = 2$ Supergravitasi Berdimensi Empat TerKoplel Multiplet Vektor. *Riset Inovasi KK*. 2011
3. S. Satira. Optimalisasi Perilaku Sensor Piezoelektrik dari bahan poli vinilden fluorid (PVDF) terhadap tanggap Frekuensi (frequency reponse). *Riset Inovasi KK*. 2011

4. Triyanta. Hamburan Medan Skalar di dalam Teleparallel Gravity. *Riset Inovasi KK*. 2011
5. M. Djamal. Fabrikasi Sensor Kelembaban Udara Berbasis Serat Nano. *Riset Inovasi KK*. 2011
6. F.P. Zen. Skenario Alam Semesta Brane World dengan Keberadaan materi dan Energi Gelap. *Riset Inovasi KK*. 2011
7. B.E. Gunara. Flat - Stationary Black Holes in Gauged $N = 2$ Supergravity. *Riset Ikatan Alumni*. 2011
8. F.P. Zen. *Riset Program Doktor Unggulan Batch I*. 2011
9. Triyanta. *Riset Program Doktor Unggulan Batch II*. 2011
10. Suparno. Optimalisasi Perilaku Sensor Piezoelektrik dari Bahan PVDF terhadap Tanggap Frekuensi. *Riset KK*. 2011
11. Suprijadi. Sistem pemetaan dan deteksi 3 dimensi dengan menggunakan metoda stereo-vision. *Hibah Kompetensi, DIKTI, 2010-2011*. 2011

Publications

1. M. Djamal, Ramli, F. Haryanto, Khairurrijal. Chapter 6. GMR Biosensor for Clinical Diagnostic. *Buku berjudul Biosensors for Health, Environment, and Biosecurity, P. A. Serra (Ed.), (Rijeka, Croatia, Intech, 2011), pp. 149-164*. 2011.
2. Arianto, F.P. Zen, S. Feranie, I P. Widyatmika, B.E. Gunara. Kaluza-Klein Brane Cosmology with a bulk Scalar Field, arXiv:1103.1703. *Physical Review D* 84 (2011) 044008. 2011.
3. B.E. Gunara, F.P. Zen, Arianto. $N = 1$ Supergravity BPS Domain Walls on Kähler-Ricci Soliton, arXiv:0901.0416. *Reports on Mathematical Physics* .Vol. 67. 2011.
4. F. Akbar, B.E. Gunara. Spherical Symmetric 4d the Ricci Flow Solution with Constant Scalar Curvature Space as Initial Geometry. *International Mathematical Forum*. Vol. 6.No. 7. 2011.
5. M. Djamal, Ramli, S. Satira, Suprijadi. Development of Low Cost Vibration Sensor based on Flat Coil Element. *International Journal of Mathematical Models and Methods in Applied Sciences*. Vol. 2.No. 5. 2011.
6. A.B. Suryamas, M.M. Munir, T. Ogi, Khairurrijal, K. Okuyama. Intense green and yellow emissions from electrospun BCNO phosphor nanofibers, *J. Mater. Chem.*, 21, 12629. 2011.
7. D. Lusitasari, Triyanta. Alat Ukur Tensor Inersia dan Aplikasinya pada Raket Bulutangkis. *Jurnal Inovasi Pembelajaran Sains JIPS 1 (1) 5-8*. 2011.
8. Hendro, M. Djamal, D. Kurnia, R. Hidayat, Buchari. Observation of Substrate Effect on SPR Frequency During In Situ Measurement of Polymer LED. *Journal of Indonesian Journal of Physics (IJP)*. 2011.
9. M. Djamal, Ramli. Development of GMR Materials and Its Role for Sensors. *ICXSM 2011*. 2011.

10. M. Djamal, E. Sanjaya, Islahudin, Ramli. *The Low Frequency 2D Vibration Sensor Based on Flat Coil Element, ICPAP*. 2011.
11. M. Djamal, Suryono, Ramli. Ultrasonic Sensor and Its Application to Temperature Measurement. *ICPAP*. 2011.
12. M. Djamal, Ramli, S. Viridi, Khairurrijal. Giant Magnetoresistance Effect in Organic Material and Its Potential for Magnetic Sensor. *ICICI-BME 2011*. 2011.
13. M. Djamal, E. Sanjaya, Ramli, Yulkifli. Development of Fluxgate Sensors and Its Applications. *ICICI-BME 2011*. 2011.
14. Buchari, I. Noviandri, M. Djamal, M. Evita. Development of New Coated Wire Nitrate Selective Electrode Sensor for Determination of Nitrate Concentration in an Aqueous Sample. *ICICI-BME 2011*. 2011.
15. M.M. Munir, F. Iskandar, M. Djamal, K. Okuyama. Morphology Controlled Electrospun Nanofibers for Humidity Sensor Application. *4th Nanoscience and Nanosymposium (NNS2011)*. 2011.
16. M.M. Munir, F. Iskandar, K. Okuyama. Controlled Electrospun Nanofibers and Their Applications. *4th Nanoscience and Nanosymposium (NNS2011)*. 2011.
17. M. Djamal, Ramli, Rahadi, E. Sanjaya. Sensor Magnetik GMR, Teknologi dan Aplikasi Pengembangannya. *Seminar HFI Purwokerto*. 2011.
18. M.M. Munir, T. Ogi, K. Okuyama. Measurement of ion-induced nucleation rate in $\text{SO}_2/\text{H}_2\text{O}/\text{N}_2$ mixtures under different pressure and temperature. *The 28th Symposium on Aerosol Science and Technology*. 2011.
19. K. Ming, Triyanta. Ekuivalensi Teleparallel Gravity dan Teori Relativitas Umum. *Seminar Nasional Matematika, UNPAR*. 2011.
20. Triyanta, Gonjang-ganjang Neutrino dengan Laju Lebih Besar dari Laju Cahaya. *Seminar Kontribusi Fisika*. 2011.

Physics of Magnetism and Photonics Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



Researches in photonic material and technology are focused on the development of photonic and nonlinear optical materials, waveguide based optical periodic systems, light emitting sources for applications in telecommunication/information technology as well as optical sensors. Meanwhile, researches in magnetic materials and technology are focused on the development of superconductors, dilute magnetic semiconductors (DMS), transition metal oxides for applications in frictionless magnetic bearing, superconducting magnetic energy storage (SMES), fault current limiter, spintronics and thermoelectric power source. Our research is intertwined between theories, experiments and modeling by emphasizing analyses of experimental results based on theoretical model as well as computational and simulation results.

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9. Tjia May On, Dr., Prof., (retired)

Grants

1. Herman. Kajian sifat optik dari film tipis DR1 yang difabrikasi dengan Metode EFA-PVD. *Riset Inovasi KK*. 2011
2. I.M. Sutjatja. Efek Doping Y pada Peningkatan nilai daya Thermoelektrik dari bahan magnetik Oksida Kobalt berbasis Bi-2228. *Riset Inovasi KK*. 2011
3. R. Hidayat. Kajian Fabrikasi Lapisan Nano Metal Oksida Sebagai Material Akseptor Dalam Sel Surya dan kajian Transport Pembawa Muatannya. *Riset Inovasi KK*. 2011
4. A.A. Iskandar. Analysis of Optical Properties of Hybrid Semiconductor Metal Nano Particle. *Asahi Glass Foundation*. 2011
5. Herman. Surface Characterization of Thin Films DR1 Prepared by EFA-PVD Method. *Program Academic Recharging*. 2011

6. A. Nugroho. Study of Spin Dynamics in Multiferroic Cu-hybrids. *Asahi Glass Foundation*. 2011
7. A. Nugroho. *Riset Program Doktor Unggulan Batch III*. 2011

Publications

1. S. Hidayat, P. Pitriana, R. Hidayat, Fitrilawati, B.A. Siregar, M. Ozaki. Application of Hybrid Polymer as a Two Dimensional Grating and It's lasing Characteristic. *Sains Malayasiana*. 2011.
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Nuclear Physics and Biophysics Research Division

Faculty of Mathematics and Natural Sciences
Institut Teknologi Bandung



Research in nuclear reactors field includes nuclear reactors/ power plant design and safety analysis especially for the fourth generation of nuclear power plant which has some advantages such as inherent safety capability, fuel breeding capability, economical, able to burn their own wastes, and non-proliferation features. Research in biophysics is directed to study advanced physical mechanisms in biosystems (molecules, cells, organs) including molecular biophysics, membrane biophysics and radiation biophysics and medical physics.

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Grants

1. Z. Su'ud. Optimasi Disain Reaktor Kecil dan Menengah Moduler Berumur Panjang dengan Uranium Alam Sbagai Input Siklus. *Hibah Bersaing Dikti*. 2011
2. A. Waris. Optimasi Daur ulang Limah Nuklir Secara langsung dalam Reaktor Nuklir Jenis LWR. *Hibah Bersaing Dikti*. 2011
3. Rusnadi. Sintesis, karakterisasi dan aplikasi Mikrokapsul Ca-Alginat yang mengandung Ligan Pyrazolone untuk pemungutan Ion Logam tanah Jarang. *Hibah Fundamental*. 2011
4. R. Widita. Segmentasi dan registrasi citra CT/SPECT untuk organ Elastik pada terapi interfraksi. *Riset Inovasi KK*. 2011

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7. S. Viridi. Karakterisasi Tumbuhan antar Nukleon dengan dinamika Molekuler Butiran untuk Menentukan Kestabilan Inti. *Riset Inovasi KK*. 2011
8. A. Waris. Daur Ulang limbah Nuklir dalam Molten Salt Reactor (MSR) dengan Analisis Burnup 3-Dimensi. *Riset Inovasi KK*. 2011
9. S. Viridi. Modelling of Self-Siphon Using Molecular Dynamics Implementing Granular - Chain Model and Finite Element Method. *Riset Ikatan Alumni*. 2011
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Physics of Earth and Complex Systems Research Division

Faculty of Mathematics and Natural Sciences
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PHYSICS OF EARTH AND COMPLEX SYSTEMS RESEARCH DIVISION

Physics of complex systems focuses on the study of natural phenomena related to the complex systems by means of physical concepts. Those concepts are then used to understand the systems. Study of complex systems includes development of concepts and methodology to conduct observation, processing, modeling, and interpretation of its response functions and also their applications to improve human welfare. Research topics include natural resources, environmental problems and disasters, properties of materials, image processing and noise analysis, as well as computer intelligence, chaos and fractals. Expertise on computational and instrumentation are also interests of our groups. Staff member of our group have expertise and interest in various fields, such as seismology, magnetisms electromagnetisms, rock physics, physics of volcanic processes and natural hazards, geo-technique and environmental and exploration geophysics.

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Grants

1. Nurhasan. Pengembangan Metode Pemantauan aktivitas gunung api berdasarkan pada sifat listrik dan magnetik. *Hibah Bersaing Dikti*. 2011
2. U. Fauzi. Pemodelan Dinamika Molekuler dan Struktur Resistivitas pada Bahan Butiran Tanah untuk Prediksi Longsor. *Hibah Kompetensi Lanjutan*. 2011

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4. D. Sutarno. *Riset Program Doktor Unggulan Batch III*. 2011

Publications

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16 RECENT ACQUISITION

FMIPA ITB acquired a few advanced instruments in the late 2010. Upon installation, the instruments are fully operational and currently being actively used for research in the structure of organic and inorganic chemical compounds. The acquisition includes:

Spectrometer ESI-TOF-MS Waters Premier XE

This mass spectrometer is dedicated to measure a high resolution mass of molecule, and reports the mass of molecules with a precision of 0,1 mDa. The capability of the spectrometer allows to determine molecular formula independently without an empirical formula.

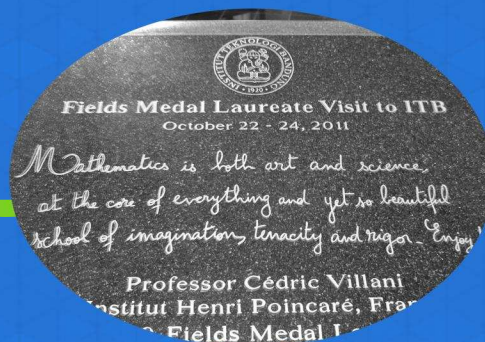
Spectrometer ESI-IT-MS Bruker HCT

This mass spectrometer is only able to measure a low resolution of molecular mass relative, and therefore it can not determine a molecular formula independently. However, the IT (Ion Trap) method allows the parent quasi molecular ion ($[M + H]^+$ or $[M + Na]^+$) and other selected ions to be fragmented, and therefore the structural units contained in the the molecules can be identified

Spectrometer NMR Agilent DD2 500 MHz

Spectrometer NMR (Nuclear Magnetic Resonance) is a versatile instrument that can identify structural units, as well as a complete structure of a molecule, including its stereochemistry. NMR measurement can be done both for liquid or solid sample

2012



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