**A³G MONTHLY MEETING & ALGEBRA & ANALYSIS SEMINAR SERIES**  
**SEMESTER II, 2011/2012**

Date/Day : Thursday, 8 March 2012  
Time : 9:00 am – 11:00 am  
Venue :  
1. Algebra Seminar –  
   Bilik Mesyuarat dan Persembahan Jabatan Matematik  
   (Meeting & Seminar Room, Dept of Math Sciences) - C22-310  
2. Analysis Seminar –  
   Meeting Room, Dept of Math Sciences – C22 Level 4

**TENTATIVE SCHEDULE**

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<td>9:00 – 9:30 am</td>
<td>“A³G 2011 and 2012 KAI” - Assoc Prof Dr Nor Haniza Sarmin, A³G Research Group Leader</td>
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<td>9:30 – 10:00 am</td>
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| 10:00 – 10:30 am | **ALGEBRA SEMINAR (C22-310)**  
   Hazzirah Izzati Mat Hassim (PhD 4th Semester)  
   “On A Homological Functor of Some Bieberbach Groups With Cyclic Point Group of Order Two”  
   Mohsen Aghaeiboorkheili (PhD 2nd Semester)  
   “The Riemann-Hilbert problem with discontinuous coefficients” |
| 10:30 – 11:00 am | **ANALYSIS SEMINAR (C22 Level 4)**  
   Fadila Normahia Abd Manaf (PhD 6th Semester)  
   “The n-th Commutativity Degree of Some Finite Groups of Nilpotency Class Two”  
   Sarah A’fifah binti Abdullah Sani (M.Sc. Dissertation II)  
   “Study of beam bending problem under singular loading condition and having various jump discontinuities” |

Organized by  
Applied Algebra and Analysis Group (A³G),  
Nanotechnology Research Alliance  
Universiti Teknologi Malaysia, Johor Bahru, Johor  
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ON A HOMOLOGICAL FUNCTOR OF SOME BIEBERBACH GROUPS WITH CYCLIC POINT GROUP OF ORDER TWO

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Abstract

The homological functors of a group were originated in homotopy theory as well as in algebraic K-theory. One of the homological functors of a group \( G \), called \( J(G) \) is the kernel of the homomorphism \( \kappa: G \otimes G \rightarrow G' \) defined by \( \kappa(g \otimes h) = [g, h] \) and \( [g, h] = ghg^{-1}h^{-1} \). It is closely related to the nonabelian tensor square of the group denoted as \( G \otimes G \) which is generated by \( g \otimes h \), for all \( g, h \in G \) subjects to the relations \( gg' \otimes h = (g^s g' \otimes h)(g \otimes h) \) and \( g \otimes hh' = (g \otimes h)(h \otimes h') \) where the action is taken to be conjugation. A Bieberbach group is defined as a torsion free crystallographic group. In this presentation, \( J(G) \) are computed for some Bieberbach groups with cyclic point group of order two.

Keywords: Homological functors; nonabelian tensor square; Bieberbach groups.
THE $n$-TH COMMUTATIVITY DEGREE OF SOME FINITE GROUPS OF NILPOTENCY CLASS TWO

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Abstract

Let $G$ be a finite group. The $n$-th commutativity degree of a group $G$ is the probability that the $n$-th power of a random element commutes with another random element from the same group, denoted as $P_n(G)$. In 2006, Mohd Ali and Sarmin introduced the concepts of $n$-th commutativity degree which has been computed for some values of $n$ and some 2-generator 2-groups of nilpotency class two. This research is based on the classification of 2-generator $p$-groups of nilpotency class 2, $p$ an odd prime that was introduced by Bacon and Kappe in 1993. In this talk, the $n$-th commutativity degree for 2-generator $p$-groups of nilpotency class two is presented.
Riemann-Hilbert problems (briefly, RH problems) and integral equations with the generalized Neumann kernel has been investigated in Wegmann, Murid, and Nasser (2005) for simply connected regions, and in Wegmann and Nasser (2008) for bounded and unbounded multiply connected regions, both for continuous coefficients. In this research we will study RH problem with finite number of first kind discontinuities. Also we will solve the problem of computing the function that has Dirichlet condition in the segment of a simply connected region and the rest of segment it has Neumann condition by generalized Neumann kernel method.

Keywords: Riemann-Hilbert problem, Generalized Neumann kernel, Mixed boundary value problem
STUDY OF BEAM BENDING PROBLEM UNDER SINGULAR LOADING CONDITION AND HAVING VARIOUS JUMP DISCONTINUITIES

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Abstract

Using a mathematical approach, this study seeks the solution to the problem of beams bending under singular loading conditions and having various jump discontinuities. Previous study shows that, for beams that have jump discontinuities, the changes will occur in the form of the governing differential equations. And the result shows that for Euler-Bernoulli beams problem there will have changes in the force terms only while the operator of the differential equation remain unchanged. Meanwhile for Timoshenko beams with jump discontinuities, in addition to changes in the force term, the operator of one of the governing differential equation changes. Hence in addition to that, this study proposed the Finite Element Method (FEM) in order to solve the same problem. It is being applied to obtain approximation solution.

Keywords: Beams bending problem; Finite Element Method.