A^{3}G MONTHLY MEETING &
SEMINAR SERIES
SEMESTER II, 2014/2015

Date/Day : 12 March 2015, Thursday
Time : 8:30 am – 10:30 am
Venue : Meeting & Presentation Room, Dept. of Mathematical Sciences (C22-310)

TENTATIVE SCHEDULE

Time	Speakers
8:30 – 9:15 am	KAI Presentation by **AAAG Research Group Leader**
9:15 – 10:00 am	Mock Viva for PhD Candidate: Mathuri Selvarajoo **Probabilistic Splicing and Sticker Systems in DNA Computing**
10:00 – 10:30 am	Refreshment

Organized by
Applied Algebra and Analysis Group (A^{3}G),
Nanotechnology Research Alliance
Universiti Teknologi Malaysia, Johor Bahru, Johor
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ABSTRACTS

PROBABILISTIC SPLICING AND STICKER SYSTEMS IN DNA COMPUTING

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ABSTRACT

This research discusses the modeling of biological systems in DNA which involves Formal Language Theory (comprises of Theoretical Computer Science and Applied Discrete Mathematics) in DNA computing. These modelings are based on the recombinant behaviour of deoxyribonucleic acid (DNA) molecules. Two of the mathematical modelings used are splicing and sticker systems. In splicing systems, probability is attached to the DNA strands; while in sticker systems, probability is attached to the axioms and dominoes of the DNA strands. In this research, probability is introduced as a restriction in splicing and sticker systems to increase the computational power of the languages generated. The application of probability in splicing systems, sticker systems, variants of splicing and sticker systems are established as an extension of the original models of splicing and sticker systems. Moreover, the languages generated by probabilistic splicing systems, probabilistic sticker systems and variants of probabilistic splicing and sticker systems are developed by considering the threshold languages in order to increase the computational power of the languages generated according to the Chomsky hierarchy. The original models of splicing, sticker, and variants of splicing and sticker systems with finite components can only generate regular languages. Here, it has been found that some probabilistic splicing system, probabilistic sticker system, and variants of probabilistic splicing and sticker systems generate non-regular languages. Lastly, a computer programming is designed to illustrate the application of probability in splicing systems and variants of splicing systems. At the end of this research, it is shown that the computational power of the languages generated by probabilistic models are higher than those of the original models.