MONTHLY MATHEMATICAL COLLOQUIUM

1/2020

Tentative

9.15 am   Presentation by Dr. Najihah binti Mohamed

Title: CURVE RECONSTRUCTION BY METAHEURISTICS ALGORITHMS ON CUBIC RATIONAL BÉZIER FUNCTION

9.45 am   Presentation by Mr. Yershat Sapazhanov

Title: SHARING KNOWLEDGE FROM SENIOR LECTURER OF SULEYMAN DEMIREL UNIVERSITY

ABSTRACT

CURVE RECONSTRUCTION BY METAHEURISTICS ALGORITHMS ON CUBIC RATIONAL BÉZIER FUNCTION

Curve reconstruction regularly used in reverse engineering. Meanwhile, curve fitting is one of the main compositions of curve reconstruction that is usually represented by mathematical functions which may need to meet some constraints. Various of curve fitting studies had been done by many researchers specifically using optimisation technique. The optimisation technique consists of exact algorithm, and approximate algorithm. The approximate algorithm is a good technique to be highlighted since it is a feasible way to develop an easier, more convenient curve fitting method, may solve a large scale problem and produce a better quality end result. Metaheuristics is one of approximate algorithms and it has strong, intelligent mechanisms to avoid being trapped in the local minimum, depends on a fairly simple concept and can be used in a variety of problems covering different disciplines and use to find approximate solutions for many complicated optimisation problems. Example of metaheuristics algorithms are Harmony Search, Genetic Algorithm and Particle Swarm Optimisation. A Modified Harmony Search is proposed, which borrowed mechanisms from the Genetic Algorithm and the Particle Swarm Optimisation which incorporated into the classical Harmony Search. Meanwhile, non-rational Bézier function is used as the fitting function, and this curve fitting scheme also proposes the technique of setting up the search spaces of certain decision variables. In order to have the smoothness of the joining curves of Bézier functions, C^1 and G^1 continuity conditions were applied. These continuities joint are maintained in the scheme through the application of the geometrical technique. This scheme is tested on several images and comparison procedures are performed between the selected algorithms and constraints.