

Curve fitting by rational cubic Bézier with C^1 and G^1 continuity using metaheuristics methods

Mohamed, N.^a, Ramli, A.L.A.^b, Majid, A.A.^b, Piah, A.R.M.^c

^aFaculty of Industrial Sciences and Technology, Universiti Malaysia Pahang Lebuhraya Tun Razak, Kuantan, Pahang, 26300, Malaysia

^bSchool of Mathematical Sciences, Universiti Sains Malaysia, USM, Penang, 11800, Malaysia

^cPostgraduate Centre, DRB-HICOM University of Automotive Malaysia, Pekan, Pahang, 26607, Malaysia

ABSTRACT

Rational cubic Bézier curves are used to approximate the data sets while minimizing the least-squares error function using different metaheuristics algorithms. Those metaheuristics algorithms are Harmony Search, Genetic Algorithm, Particle Swarm Optimization and Modified Harmony Search. This scheme is implemented with continuity of C^1 and G^1 . The comparative and analysis behaviour between the two conditions for the curve fitting on four outline of the test images boundary will be discussed. Based on the analysis, Modified Harmony Search algorithms is more stable, accurate and precise compared to other algorithms, and G^1 continuity condition leads to a better curve fit compared to C^1 .