

A NOVEL HYBRID SIMULATED ANNEALING –GRADIENT ALGORITHM FOR OPTIMUM SYNTHESIS OF FUNCTION GENERATION PROBLEM

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Abstract

This paper presents the results of a newly developed hybrid Simulated Annealing –Gradient Algorithm (SAG) for the optimization of mechanism synthesis for function generation problem and proposes a hybrid optimization method based on the fusion of the Simulated annealing (SA) and Marquardt Search (MS), gradient search based method nonlinear regression algorithm, in which the SA is embedded the MS to enhance its search capability. This algorithm combines the advantages of the global optimization technique and a classical non linear programming technique. A brief overview of hybrid SAG algorithm is presented and applied to dimensional synthesis of a planer four bar mechanism. The optimization is carried out to minimize the objective function formulated from the structural error at the accuracy points. A novel hybrid SAG is employed to determine the optimal values for the design variables that best satisfy the desired objectives of the problem. Simulation results demonstrate the remarkable advantages of our approach in achieving the diverse optimal solutions and improved converge speed. The applicability of hybrid SAG algorithm is illustrated by solving a nonlinear function generation problems and the method produce accurate and acceptable solution in all cases.

Keywords: Function generation, simulated annealing, Marquardt search, Hybrid algorithm, four bar mechanism.