

Newton Competitive Genetic Algorithm Method for Optimization the Production of Biochemical Systems

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In this work, the optimization of biochemical systems production is performed by using a hybrid method of Newton competitive genetic algorithm is presented. The proposed method works by representing the biochemical systems as a generalized mass action model, where it leads to the process of solving a complex non-linear equations system. The optimization process becomes hard and difficult when it involves multi-objective problem. This is where two objectives, namely the maximize the biochemical systems production and minimize the total amount of chemical concentrations involves. To deal with the problem, this work proposed a hybrid method of the Newton method, genetic algorithm, and competitive co-evolutionary algorithm. The proposed method was experimentally applied on the benchmark biochemical systems and the experimental results showed that the proposed method achieved better results compared to the existing works.

Keywords: Biochemical systems, Newton method, Genetic algorithm, Competitive co-evolutionary algorithm, Computational Intelligence.