

Improved Differential Evolution Algorithm for Parameter Estimation to Improve the Production of Biochemical Pathway

Abstract

This paper introduces an improved Differential Evolution algorithm (IDE) which aims at improving its performance in estimating the relevant parameters for metabolic pathway data to simulate glycolysis pathway for yeast. Metabolic pathway data are expected to be of significant help in the development of efficient tools in kinetic modeling and parameter estimation platforms. Many computation algorithms face obstacles due to the noisy data and difficulty of the system in estimating myriad of parameters, and require longer computational time to estimate the relevant parameters. The proposed algorithm (IDE) in this paper is a hybrid of a Differential Evolution algorithm (DE) and a Kalman Filter (KF). The outcome of IDE is proven to be superior than Genetic Algorithm (GA) and DE. The results of IDE from experiments show estimated optimal kinetic parameters values, shorter computation time and increased accuracy for simulated results compared with other estimation algorithms