

# A Comparison of Simulated Annealing and Genetic Algorithm Approaches for Cultivation Model Identification

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Simulated annealing (SA) and genetic algorithms (GA) are two stochastic methods that are currently in wide use for solving difficult optimization problems. These algorithms are often viewed as quite distinct, competing paradigms in the field of modern heuristics. This paper compares the performance of the GA and SA for parameter identification of nonlinear mathematical model of an *E. coli* cultivation process. A system of four ordinary differential equations is proposed to model biomass growth, glucose utilization, and dissolved oxygen consumption. Parameter identification is carried out using real experimental data set from an *E. coli* MC4110 fed-batch cultivation process. The results show that the GA produces solutions that are identical to or better than SA, but SA achieves its solutions much more quickly.