

# Improvement of Multi-population Genetic Algorithms Convergence Time

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## Abstract

Different kinds of multi-population genetic algorithms have been investigated for a parameter identification of a fermentation process. Altogether six realizations of multi-population genetic algorithms have been proposed, four of them with a different sequence of implementation of main genetic operators selection, crossover and mutation, and another two without mutation. A comparison of considered six kinds of genetic algorithms is presented for a parameter identification of a fed-batch cultivation of *S. cerevisiae*. The influence of the most important genetic algorithm parameters, namely generation gap and rates of crossover, mutation, insertion and migration have been investigated too. All kinds of considered multi-population genetic algorithms lead to similar values of the optimization criterion. Among those with three genetic operators the algorithm with a sequence of selection, crossover and mutation is significantly faster than the others. When mutation is avoided, the genetic algorithm with a sequence of selection and crossover is faster than the other one.