

Control of exothermic batch process using multivariable genetic algorithm

ABSTRACT

The aim of this research is to control the reactor temperature of an exothermic batch process. During the process, large amount of heat will be released rapidly when the reactants are mixed together. The exothermic behaviour causes the reaction to become unstable and consequently poses safety concern to the plant personnel. In practice, heat is needed to speed up the reaction rate so that the overall process cycle time can be reduced whereas the cooling is employed to cool down the reactor in order to reduce excessive heat. Hence, this paper proposes genetic algorithm (GA) to control the process temperature with a predetermined temperature profile. GA exploits the probabilistic search method to optimise the specific objective function based on the evolutionary principle. Simulation assessment of the GA has been carried out using a benchmark exothermic batch process model. The results show that GA is able to control the reactor temperature effectively.