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## Abstract

Fuzzy logic control (FLC) systems have been tested in numerous practical and industrial applications as an important modeling tool that can cope with the uncertainties and nonlinearities of current control systems. The key shortcoming of the FLC approaches in the industrial environment is the number of tuning parameters to be chosen. In this paper a

technique has been offered for optimizing the membership functions of a fuzzy scheme using particle swarm optimization (PSO) algorithm. A mixture of fuzzy logic and PSO technique is employed to design a controller for a nonlinear chemical plant. To establish its efficiency, the proposed technique was employed to enhance the Gaussian membership functions of the fuzzy model of a nonlinear continuous stirred tank heater (CSTH); results show that the optimized membership functions (MFs) offered better performance than a fuzzy model for the same system when the MFs were heuristically described.

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## Index Terms

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Control Systems

**Key words**

Fuzzy logic control (FLC)

Membership function (MF)

Particle swarm optimization (PSO)

Continuous stirred tank heater (CSTH)

