Abstract

The main contribution of this paper is aimed to design and implementation of an intelligent level controller and intelligent 2×2 decentralized PI controller and a lead compensator for the forced circulation evaporator by using PSO strategy. The most important thing to guarantee the safe operation of the forced circulation evaporator, without damaging the installed equipment, is obtaining optimal controllers for the evaporator operating pressure and the level of liquid inside the separator part. Also the percent of the concentration of the non-volatile in the solution must be effectively controlled to required limits. PSO algorithm is implemented in MATLAB and is compared to GA strategy for design and implementation of optimal controllers for the evaporator system by minimizing the summation of the characteristics of unit step response. Also computer simulation results are compared to the different two cost functions methods by analyzing the performance, stability and robustness with respect to variation of the evaporator control system.


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Index Terms

Computer Science | Control Systems

Keywords

Particle Swarm Optimization; Genetic Algorithm; Forced Circulation Evaporator; Performance Indices.