Abstract

Automatic control has played a vital role in the advancement of engineering and science. It is also essential in such industrial operations as controlling pressure, temperature, humidity, viscosity and flow in the process industries. Proportional Integral Differential (PID) controllers marked its place in many of the industrial processes. Tuning a controller is the adjustment of its control parameters. Computational Intelligence (CI) an off shoot of Artificial Intelligence relies on heuristic algorithms mainly evolutionary computation. Swarm intelligence (SI) a derivative of CI, describes the collective behaviour of decentralized, self-organized systems. Ant behaviour was the inspiration for the Meta heuristic optimization technique. This paper presents an application of an Ant Colony Optimization (ACO) algorithm to optimize the parameters in the design of a (PID) controller for a highly nonlinear conical tank system. The proposed work discusses in detail, the ACO, a CI technique, and its application over the parameter tuning of a PI controller in a real time process. The designed controller’s ability in tracking a given set point is compared with an Internal Model Control (IMC) tuned controller.
Reference

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- PID controllers
- Computational Intelligence
- Ants Colony Optimization
- Internal Modal Control
- Meta heuristic optimization