Ant Colony Optimization Algorithm is an optimization technique inspired by natural processes that are used in particular in combinatorial optimization problem. In this algorithm, there are a number of artificial ants which serves as an agent assigned to find a solution to an optimization problem. This algorithm has been applied to the Travelling Salesman Problem (TSP) and Quadratic Assignment Problems (QAP). In the world control applications, this algorithm is used to optimize parameters of PID controller.

In this research, for optimizing the parameters of PID controller using Ant Colony Optimization is carried hybridization PID tuning method using Internal Model Control and Ant Colony Optimization. This method is tested in a simulation at Automatic Voltage Regulator (AVR) system.

From the simulation results that obtained, the system is able to produce a better performance (without overshoot, faster settling time and rise time) than any other system tuning results using Ant Colony Optimization to the hybridization of different tuning methods.

Keywords: Ant Colony Optimization (ACO), Internal Model Control (IMC), Automatic Voltage Regulator (AVR)
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