

Evolutionary Algorithms based Controller design for cold storage system

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Abstract. Implementing optimization for control variables for electrical based storage process results in increase of the energy efficiency. Optimization can implemented for the control variable of the process that are key aspects to the increase of energy efficiency. Thus for the cold storage process controlling of evaporator inlet temperature and heat load has done. This in turn provides effectiveness to temperature of chamber and power consumption. Mathematical Modelling of cold storage is a multi-input multi-output (MIMO) system and it has done by converting the differential equations to the first order plus dead time (FOPDT) system and summing the systems accordingly. This resulted in obtaining the curves of the evaporator inlet temperature (T_e), chamber temperature (T_c) and power consumption (P_c) in open loop. Optimization techniques such as Simulated Annealing (SA), Ant Colony Optimization (ACO), Particle Swarm Optimization (PSO) and Genetic Algorithm (GA) have used for optimizing the PID Controller which in turn controlling the system. The comparison studies of time domain specifications for these controllers has done and the suitable controller for the process has obtained.

Keywords: Cold Storage, Simulated Annealing (SA), Ant Colony Optimization (ACO), Particle Swarm Optimization (PSO) and Genetic Algorithm (GA), Proportional Integral Derivative (PID) Controller.