A new approach for controlling steam turbine of thermal power plant

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Introduction. A thermal power plant is difficult to be controlled accurately due to the non-linear time varying behavior of such a system. In order to overcome these difficulties, engineers have operated new controllers that incorporate human experience using artificial intelligence such as Fuzzy logic. Materials and methods.This paper describes a thermal power plant simulator developed by Matlab/Simulink software based on fuzzy logic control technique which has been widely used in power plants. Results. The simulator has been developed for a steam turbine generator of a thermal power plant using the powerful Matlab/Simulink software program. It includes a boiler, a steam turbine and a generator. Parameters that have been used for testing this simulator have been taken from the (SIEMENS-KWU-SGP) steam turbine generator of 176 MW. The selector takes the control by selecting the appropriate controller. Since the speed of 50 Hz is reached, the selector selects the power controller that controls the generated power according to the network need (depending on the load). The pressure controller is selected in case of pressure drop that is not recovered by the boiler at the desirable time. Simulation of thermal power plant using different types of controllers such as PID, FLC and FGPI is investigated. The FGPI simulation result shows better response time and convergence to the reference or power set point. It can be noticed that the proposed FGPI controller has better performance in terms of settling time and overshoots of system output gain (Fig.1). Conclusions. PID, FLC and FGPI controllers have been investigated separately. The proposed FGPI controller has better performance for settling time and overshoots of system output. Therefore, the FGPI controller can be recommended for controlling outputs of such power plant.

References.

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