

# Fuzzy Control of Cooling Water Pumps related to a Power Plant

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**Abstract** — Optimum operation of cooling water systems means minimum use of water while maintaining proper temperatures to limit algae growth and cool all equipment properly. Combined application of inverters and cooling water pumps brings us not only good energy-saving benefits but some new problems, such as inverters configuration and overload etc. The objective of this paper is to find a suitable solution by designing the intelligent controller for frequency controlling of cooling Water system, such as fuzzy logic and to investigate the controllability of this model under various changes of static head system. Based on the mathematical model of puming systems with or without static head, the paper discusses some issues in detail, such as pressure and flow rate regulation. In fuzzy logic control, Mamdani model is used to control the system. The suggested system uses the concept of fuzzy logic system where the fuzzy rule base consists of a collection of fuzzy IF–THEN rules. The fuzzy inference engine uses these fuzzy IF–THEN rules to determine a mapping from fuzzy sets in the input universe of discourse to fuzzy sets in the output universe of discourse based on fuzzy logic principles. The fuzzy model can be successfully used for the variable speed control of hydraulic systems, when the Affinity Laws not observe exactly.

**Keywords** — cooling water system, variable speed, mathematical model of pump, controller, fuzzy logic approach

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