

DESIGN METHODOLOGY FOR FUZZY LOGIC CONTROLLERS

Nada Damljanović, Vučelja Lekić, Katarina Pavlović, Mladen Janjić

¹University of Kragujevac, Faculty of Technical Sciences Čačak, Svetog Save 65, 32000 Čačak, Srbija, nada.damljanovic@ftn.kg.ac.rs, vucelja.lekic@ftn.kg.ac.rs, katarina.tasic@ftn.kg.ac.rs, mladen.janjic@ftn.kg.ac.rs

ABSTRACT

The paper presents an insight into the mathematical basis of fuzzy linguistic modeling and discusses the sensitivity of fuzzy rule-based systems with respect to membership function parameters, rule structure, and inference mechanisms. Examples with different inference models are analyzed and compared in order to illustrate their influence on the behavior and performance of fuzzy systems. Particular attention is devoted to the effects of parameter variations on system stability, robustness, accuracy, and interpretability. The study highlights the importance of sensitivity analysis in the design of reliable fuzzy controllers.

Keywords: Fuzzy logic, linguistic variable, inference, controller.