



DESIGN AND TUNING OF FUZZY CONTROL SURFACES WITH BEZIER FUNCTIONS

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ABSTRACT—Design and Tuning a fuzzy logic controller (FLCs) are usually done in two stages. In the first stage, the structure of a FLC is determined based on physical characteristics of the system. In the second stage, the parameters of the FLC are selected to optimize the performance of the system. The task of tuning FLCs can be performed by a number of methods such as adjusting control gains, changing membership functions, modifying control rules and varying control surfaces. A method for the design and tuning of FLCs through modifying their control surfaces is presented in this paper. The method can be summarized as follows. A fuzzy control surface is modeled with Bezier functions. Shapes of the control surface are then adjusted through varying Bezier parameters. A Genetic Algorithm (GA) is used to search for the optimal set of parameters based on the control performance criteria. Simulation results on various control systems show the effectiveness of the proposed method.

Key Words: Fuzzy logic controllers, Fuzzy PID controllers, Fuzzy control surfaces, Bezier functions