

Proceedings of the 2nd Annual World Conference
of the Society for Industrial And Systems Engineering
Las Vegas, NV, USA
November 5-7, 2013

Modeling of a Welding Process with Interval Type-2 Fuzzy

KL Guajardo-Cosío¹, RJ Praga-Alejo², and DS González-González³

^{1,2} COMIMSA (Corporación Mexicana de Investigación en Materiales), Calle Ciencia y Tecnología No. 790, Fracc. Saltillo
400 C.P. 25290, Saltillo, Coahuila, México. Phone: (+52) 01 844 411 32 00.

³ Facultad de Sistemas, Universidad Autónoma de Coahuila, Ciudad Universitaria, Carretera a México Km. 13, Arteaga,
Coahuila, México. Phone: (+52) 01 844 171 50 02.

Corresponding author's Email: karla.guajardo@comimsa.com

Abstract: There are several technics to model, control, predict or forecast nonlinear processes or where there is too much uncertainty. The Intelligent Systems have been used for this kind of processes. In the Intelligent Systems exists the methodology Fuzzy Logic System (FLS) which has been used intensively to model complex processes. Is recommendable to apply type-2 FLS in processes where there is too much uncertainty or nonlinearity. In this paper we analyzed and modeling a Gas Metal Arc Welding process applying an Interval type-2 FLS. Furthermore, in this paper, we established how to find the uncertainty intervals in the Membership Functions; this method was a hybrid approach between type-2 FLS and Genetic Algorithm. Hence this application can predict the performance of the welding process and the results indicate that the hybrid approach (type-2 FLS and Genetic Algorithm as complement) is a good alternative method to model and predict processes with uncertainty and nonlinear behavior.

Keywords: Fuzzy Logic, Type-2 Fuzzy, Genetic Algorithm