

Proceedings of the 5<sup>th</sup> Annual World Conference  
of the Society for Industrial and Systems Engineering,  
San Francisco, CA, USA  
October 13-14, 2016

## **A Multivariate Analysis in Fuzzy Logic for Modeling a Casting Process**

**R.J. Praga-Alejo<sup>1,2</sup>, I.E. Cerda-Durán<sup>1</sup>, and D. González-González<sup>1,2</sup>**

<sup>1</sup> Corporación Mexicana de Investigación en Materiales (COMIMSA), Calle Ciencia y Tecnología #790, Col. Saltillo 400  
C.P. 25290, Saltillo, Coahuila, México. Phone: (+52) 01 844 411 32 00.

<sup>2</sup> Facultad de Sistemas, Universidad Autónoma de Coahuila, Ciudad Universitaria, Carretera a México Km. 13, Arteaga,  
Coahuila, México. Phone: (+52) 01 844 689 10 30.

Corresponding author's Email: [rolandopraga@comimsa.com](mailto:rolandopraga@comimsa.com)

**Abstract:** Actually there are several techniques to model, control, or predict nonlinear processes. One of the most important processes in the industry is the casting process. To manufacturing this type of pieces it is necessary to accomplish with some quality characteristics. For this reason, to analyze and predict these characteristics it is necessary that the model should be multivariate. 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, due to the complexity and uncertainty of the process and it is necessary these types of models. But when we have more than one response, these output variables must be correlated. Then the aim of this paper is to apply the multivariate analysis because there are correlated response variables, this type of relationship between variables indicates that should be performed multivariate analysis.

*Keywords:* Multivariate, Correlation, Fuzzy Logic, Modeling