Modeling a Machining Process through Generalized Linear Model

DS Gonzalez-Gonzalez[1], RJ Praga-Alejo[2], P Alonso-Reyes[3], JA Flores-Díaz[3], R Ojeda-Castañeda[4], and I Garcia-Calvillo[4]

[1]COMIMSA
Ciencia y Tecnología No. 790, Frac. Saltillo 400
C. P. 25290, Saltillo, Coahuila, México.

[2]Facultad de Sistemas. Universidad Autónoma de Coahuila
Ciudad Universitaria, Carretera a México Km 13
Arteaga, Coahuila, México.

[3]Departamento de Matemáticas, Facultad de Ciencias, UNAM.
Cd. Universitaria, Distrito Federal.
Código Postal 04510. México.

[4]CIMA
Saltillo, Coahuila, México.

Corresponding author's e-mail: davidgonzalez@comimsa.com

Abstract: Often is of interest to model a machining process to establish the parameter levels which optimize one or more responses. There are several methods based on linear models as the response surface methodology to perform it. However, in some cases, the model used to depict the process does not fit adequately, hence, the inference about the process and the optimization are not accurately. In this sense, alternative models which represent the process better must be used; a good option could be generalized linear models. In this paper, we propose to use a generalized linear regression for modeling a machining process, which could not be modeled by a common full quadratic polynomial. Results show that the proposed regression model performs better and realize very accurate predictions, though the inference and process optimization becomes more complex in theoretical terms.

Keywords: Generalized Linear Models, Design of Experiments, Machining Process, Regression Model