A Survey of ECDM Modeling Literature Based on Different Techniques

J Leyva-Bravo, P Chiñas-Sánchez, and A Hernández-Rodríguez

COMIMSA (Corporación Mexicana de Investigación en Materiales)
No 790 Col. Saltillo 400, C.P. 25290
Saltillo, Coahuila. México

Corresponding author's email: jansel.leyva@comimsa.com

Abstract: Industrial development has led to the need for ever more complex geometrical pieces in industries such as automotive, aerospace, electronics and others. One of the manufacturing processes that may provide these pieces is Electrochemical Discharge Machining (ECDM), which is a hybrid process between Electric Discharge Machining (EDM) and Electrochemical Machining (ECM). In contrast with EDM and ECM, ECDM enables the machining of conductive and non-conductive workpieces, making it very useful for the industry. However, in the literature ECDM is recognized as a complex process because of its operation implies the interaction of several input parameters, as well as phenomena of different nature, so ECDM is subject to inaccuracies and uncertainties both in the measurement of parameters as in the process in general. As a consequence, the design of traditional automatic controls for the correct functioning of the ECDM process becomes complicated, so ECDM does not yet have a marked presence in industrial processes and is in study phase. For a greater insertion in the industry and the development of automatic controls, it is necessary the design of models that establish the relationships between the input and output parameters, in order to represent the behavior of ECDM process as close to reality as possible. There are different techniques to model the process, however, some authors has concluded that a viable option for modeling ECDM is using fuzzy logic, which allows capturing variabilities, imprecisions and uncertainties in the process. In the present work we present a bibliographic review about the modeling of the ECDM process through different techniques.

Keywords: ECDM, modeling, fuzzy logic.