

MODELING AND MULTI-RESPONSE OPTIMIZATION OF ELECTRICAL DISCHARGE MACHINING PARAMETERS USING NON-DOMINATED SORTING GENETIC ALGORITHM-II

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Abstract

This paper presents an application of a Response surface methodology (RSM) for modeling and non-dominated sorting genetic algorithm-II (NSGA-II) for multi-objective optimization of an electrical discharge machining (EDM) process. The proposed methodology consists of two parts. In the first part, RSM is used to model highly non-linear and complex processes, resulting in accurate and reliable models. Two important aspects of machining performance of EDM, namely metal removal rate and surface roughness, are modeled based on experimental data using RSM in terms of four prominent input variables. The effect of machining parameters on the performance measures is also reported. In the second part, as the chosen machining performances are conflict in nature, the problem under consideration is formulated as a multi-objective optimization problem and solved using an efficient evolutionary optimization algorithm, NSGA-II. Finally, Pareto optimal front of solutions is also presented.

Keywords: Electrical discharge machining, MRR, surface roughness, NSGA-II