

Parametric Optimization of Electric Discharge Machining Process Using Taguchi's Method and Grey Relation Analysis

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Abstract : Process yield of electric discharge machining (EDM) is directly related to optimal combination(s) of process parameters. Optimization of process parameters of EDM is a multi-objective optimization problem owing to the contradictory behavior of performance measures. This paper employs Grey Relation Analysis (GRA) method as a multi-objective optimization technique for the optimal selection of process parameters combination. In GRA, multi-response optimization is converted into optimization of a single response grey relation grade which ultimately gives the optimal combination of process parameters. Experiments were carried out on die-sinking EDM by taking D2 steel as work piece and copper as electrode material. Taguchi's orthogonal array L36 was used for the design of experiments. On the experimental values, GRA was employed for the parametric optimization. A significant improvement has been observed and reported in the process yield by taking the parametric combination(s) obtained through GRA.

Keywords : electric discharge machining, grey relation analysis, material removal rate, optimization

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