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Original Articles

Optimization of the GTA Welding Process Using Combination of the Taguchi Method and a Neural-Genetic Approach

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Abstract

Many parameters affect the quality of the gas tungsten arc (GTA) welding process. It is not easy to obtain optimal parameters of the GTA welding process. This paper applies an integrated approach using the Taguchi method, artificial neural network (ANN), and genetic algorithm (GA) to optimize the weld bead geometry of GTA welding specimens. The proposed approach consists of two stages. First stage executes initial optimization via Taguchi method to construct a database for the ANN. In second stage, an ANN is used to provide the nonlinear relationship between factors and the response. Then, a GA is applied to obtain the optimal factor settings. The experimental results showed that the weld bead geometry of the optimal welding parameters via the proposed approach is slender than apply Taguchi method only.

Keywords:

Notes

Average SNR of total trial $\hat{\eta}$ is −4.487 (dB).

The factors are treated as pooled error.

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