عنوان مقاله:

Optimization of gas tungsten arc welding process using an integrated artificial neural network-heuristic algorithm approach

محل انتشار:

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خلاصه مقاله:

A modeling and optimization procedure based on experimental tests for gas tungsten arc welding (GTAW) process known as tungsten inert gas (TIG) welding process of AL۵۰۵۲ alloy is addressed in the present study. Welding current (I), frequency (F), welding speed (S) and gap (G) are the most important parameters in TIG welding process. Heat affected zone (HAZ) considered as the most important quality measure of the welding process. Image processing technique is used to take accurate measurements of HAZs. In order to determine the relationship between input and output parameters artificial neural networks (ANNs) has been used. Then, the trained ANNs have been used to find the optimal value of the outputs using particle swarm optimization (PSO) algorithm. Experiments have been done to verify the optimal levels of the input parameters. Results of verification test demonstrates that the proposed ANN-PSO procedure is quite efficient in modeling and optimization of TIG welding process.

کلمات کلیدی:

Tungsten inert gas (TIG) welding, modeling, optimization, artificial neural network (ANN), particle swarm optimization (PSO) algorithm, Heat affected zone (HAZ).