Multiobjective Optimization of Torch Brazing Process by a Hybrid of Artificial Neural Networks and Multiobjective Genetic Algorithm

A. Alvarado-Iniesta, J. L. García-Alcaraz, and M. I. Rodríguez-Borbón

Department of Industrial and Manufacturing Engineering
Autonomous University of Ciudad Juarez
Ave. Del Charro 450 Norte
Ciudad Juarez, Chihuahua, 32315, Mexico

Corresponding author's Email: alejandro.alvarado@uacj.mx

Author Note: Alejandro Alvarado-Iniesta is currently an assistant professor in the Department of Industrial and Manufacturing Engineering in the Autonomous University of Ciudad Juarez, Mexico. His areas of research are focused in methodologies such as fuzzy logic and artificial neural networks employed as surrogate models, and evolutive algorithms as well as swarm intelligence.

Abstract: This study presents a hybrid of artificial neural networks and multiobjective genetic algorithm to optimize the torch brazing process of aluminum in the manufacturing of condensers in the automotive industry. An artificial neural network is employed as a surrogate model of the manufacturing process. Then, multiobjective genetic algorithm is used to find the set of non-dominated solutions. The responses of interest are a quality test for the condensers and the production time. Results show this approach may support engineers to set the optimal process parameters in order to achieve competitive advantages in terms of quality and cost.

Keywords: Process Optimization, Artificial Neural Network, NSGA-II