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Cost Optimization of Welded Joints Using Particle Swarm Optimization

S. Nishanthi

ASST.PROFESSOR

Department of Mechanical engineering,
AITS, TIRUPATI- A.P, S.INDIA

Abstract: Owing to the wide utilization of weld joints in industrial processes, their cost minimization is an important target for both designers and users. In the present work, cost of the weld is minimized by considering the strength of weld. Weld joints are prepared with Mild Steel plates with use of M.S electrodes. Strength properties of weld joints like tensile stress, shear stress are found by conducting experiments with Universal Testing Machine (UTM). An objective function is formulated for minimization cost in terms of geometric properties of weld, where as constraints are formulated in terms of strength properties. The present study explores the use of non-traditional optimization Particle Swarm Optimization (PSO), for optimization of weld joints from an economic point of view. The optimization procedure involves the selection of the major geometric parameters such as length of weld, height of weld, depth of weld, width of weld and minimization of cost is considered as the design target. In the present work MATLAB program of PSO are developed and executed using weld and test data.