International J.ofMultidispl.Research&Advcs.inEngg.(IJMRAE),
ISSN 0975-7074, Vol. 3, No. IV(October 2011), pp. 227-242

MULTI-OBJECTIVE OPTIMIZATION OF A MACHINING PROCESS

E. VENU GOPAL GOUD, A. GOPALA KRISHNA AND D. V. S. S. S. V. PRASAD

Abstract

This paper presents the multi-objective optimization of CNC Turning of AISI D2 material. Spindle speed, feed rate and depth of cut are considered as control factors at three levels and metal removal rate and tool wear are considered as the performance measures. Response surface methodology is used for modeling the performance measures in terms of control factors. Second order models are developed and their adequacy is tested. Then, multi-objective optimization is carried out by considering metal removal rate and tool wear. Non-dominated sorting genetic algorithm is then applied to obtain a Pareto-optimal front. The optimized results help the operator to enhance the quality as well as machining rate.

Keywords: CNC Turning; Response surface methodology, Non-dominated sorting genetic algorithm.