

## Multi-Objective Optimisation Of CNC Milling Process For Al 6061 Using Modified NSGA-II

*Mohd F.F. Ab. Rashid, Nik M.Z.N. Mohamed, Ahmad N.M. Rose*

Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

### ABSTRACT

Computer numerical controlled (CNC) growth has revolutionised the manufacturing sectors by changing the way people work. In milling process, it has contributed to the higher productivity and better quality of the products. Although a lot of researches have been done on how to improve the process, the process improvement does not stop there because of evolving materials, methods and technologies. This paper presents a multi-objective optimisation of CNC milling process in order to achieve desired surface roughness and minimise machining time for Al 6061. A full factorial experiment has been conducted to model surface roughness by controlling three variables; spindle speed, feed rate and depth of cut. Multi-objective optimisation has been performed using modified Elitist Non-dominated Sorting Genetic Algorithm (NSGA-II) with two levels crossover. The optimisation result concluded that the modified NSGA-II was able to converge to Pareto-optimal, but having difficulties to spread solutions in wider range.

### KEYWORDS

Multi-objective optimisation; NSGA-II; CNC milling