

Experimental of multi-holes drilling toolpath using particle swarm optimization and CAD-CAM software on PCB

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ABSTRACT

A multi-holes drilling process is widely used in electronics industry to produce printed circuit board (PCB). Nowadays, millions of PCB need to be produced in a single day to support the technological growth in all aspects of life. In this industry, the most time-consuming process is to drill the holes on the board. According to a survey, the tool movement in multi-holes drilling process spent up to 70% of the machining time. Various approaches have been proposed to optimize the toolpath in multi-holes drilling process. Previously, a computational experiment has been conducted to identify the best meta-heuristic algorithm to optimize this problem. The finding shows that Particle Swarm Optimization (PSO) has outperformed other comparison algorithm to generate the best toolpath. This paper aim to validate the PSO performance through an experiment. For this purpose, the experiment consist of nine drilling problems has been conducted to compare the toolpath that generated by PSO and commercial CAD-CAM software. The results indicated that the PSO generated toolpath is consistently faster than CAD-CAM generated toolpath, with 5% average difference. This finding confirmed that PSO has a great potential to be used in this process.

KEYWORDS

CAD-CAM software; Multi-holes drilling; Particle swarm optimization (PSO)

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