Performance evaluation of m3 bottleneck based heuristic for M1M2M3 flow shop

Abstract

This project investigates the possibility of developing scheduling heuristic using bottleneck approach for a three machine flow shop scheduling with the tendency of dominant machine at the first process. Due to the re-entrant and permutation nature of the process routing, the actual bottlenecks were identified as M3 and it utilized makespan algorithms to identify bottleneck categories. Using these conditions, a new bottleneck based heuristic which called BB is developed and tested using Macro Programming in Microsoft Excel. The main objective of this project is to evaluate the performance of M3 bottleneck-based heuristic for M1M2M3 flow shop problems. A total of 3000 simulations were conducted using randomly data in order to evaluate the accuracy of the heuristic. The heuristic performance was evaluated for six and ten job problems. The dominance level groups are divided into levels of weak, medium and strong dominance. For each job problem, the BB results were compared against the results of complete enumeration and lower bound analysis. The results suggested that BB heuristic is very effective in solving scheduling problems within the strong P3 dominance level range.