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Evaluation and Comparison of Performance of the Shifting Bottleneck and Local Search Methods in Solving Job Shop Problems

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Abstract: The Job Shop (JS) scheduling problems consist of determining the optimal sequence of n jobs on m machines, which find applications in the production planning on manufacturing and service industry. The JS is considered an NP-hard. Most of the methods to solve this scheduling problem are heuristic and sometimes is difficult to decide which method is the recommended to find the best or optimal solution. This study deals with the Shifting Bottleneck (SB) and Local Search (LS) methods. The purpose is to compare and evaluate the performance of these two methods in solving the JS problem. This the optimization criteria of interest in the study were Makespan and Total Flow Time (TFT). Test problems were selected from the literature and classified into three groups; small medium and large, according to the number of Jobs and machines. The problems were solved using the Lekin® scheduler system and the values of the Makespan and TFT were recorded. The LS method resulted to be a better alternative for solving the JS scheduling problem.

Keywords: Shifting Bottleneck, Local Search, Job Shop, Scheduling