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A QUADRATIC PROGRAMMING MODEL FOR INPATIENTS OPERATING ROOM SURGERIES SCHEDULING BASED ON RESOURCES AVAILABILITY

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ABSTRACT

Scheduling inpatients' surgeries is a multifaceted scheduling problem. Variety of factors such as availability of operating rooms, surgeons' or doctors' available time, working hours, the number of operations in one planned period and unfavourable surgery hours. can make it very challenging to come up with the optimal schedule for the surgeries. Studies on inpatients' surgeries scheduling problems are still lacking, while those solved using Nonlinear Programming model are considered more complex compared to the Linear Programming model. This study concerns with solving inpatients' operations scheduling using the Quadratic Programming (QP) model. The main objectives of this study are to propose an enhanced formulation of the QP model that minimizes the total overtime and idle time of any operating room to ensure full utilization of the operating rooms, and to solve the model using the exact and heuristic approaches of MATLAB quadprog, and to analyze doctors' schedule based on the model's solution. This study employed data from a selected past study. Based on the solution obtained, the total idle and overtime hours is minimized to only 64.01 hours. Meanwhile, no doctor has been scheduled to operate on more than one inpatient in the same day. In addition, the operation rooms have been scheduled evenly with 25 inpatients' operations for each room. By reducing the total overtime and idle time will enables reduced expenses and consequently costs savings and increased revenue to the hospital and improve the quality of healthcare. Meanwhile, systematic scheduling offers more effective schedule that reduces long waiting time for surgery and length of stay at hospital for inpatients, optimizes the use of the operating rooms, and more organized and practical schedules for the doctors. Moreover, the schedule can be achieved in a timely manner by solving the model.

Keywords Inpatients Surgery Scheduling · Planning and Scheduling · Operating Room / Theater · Quadratic Programming Model · Total Idle and Overtime

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