

Interdisciplinary collaboration between engineering, mathematics and science

SEMS Research Highlights



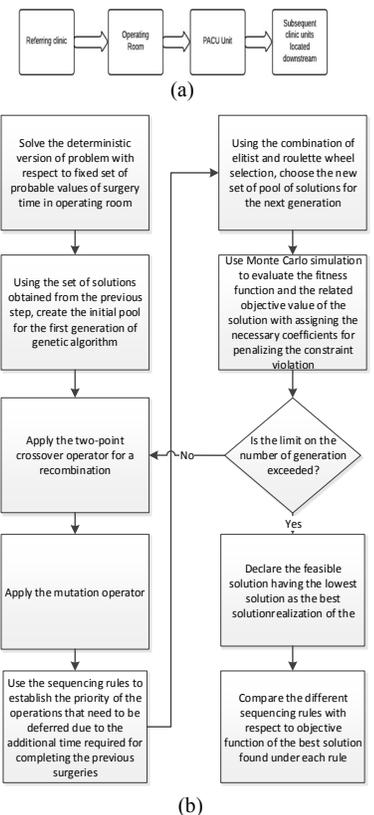
A Dynamic Model for Scheduling of Elective Patients with respect to Current Surgical Resources and Downstream Units

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This newsletter presents the research conducted within the School of Engineering, Mathematics and Science (SEMS) at Robert Morris University (RMU). It covers various relevant topics including: interdisciplinary efforts, successful research grants, student research, posters and papers, journal publications, presentations at national and international conferences, contribution to professional societies, STEM educational research, industrial consulting collaborations and applied re-

As compared to the other clinical resources deployed on the hospital floor, resources associated with the operating room (OR) are costly and scarce. Critical medical interventions are performed to handle life and death situations in operating rooms. From a business point of view, it is indicated that while ORs generate 42% of the hospital revenues they are also one of the major cost centers. All these factors point out the importance of the fact that improving the efficiency of the ORs is a critical aspect for successful financial management of any hospital. Improved planning and scheduling helps improving efficiency of the OR via optimization of limited resources and better manage ever increasing workloads. In this study, a model is developed for scheduling elective patients with respect to the

operating room, surgical resources, and downstream post anesthesia care unit. For this model, non-deterministic surgical duration times are considered that encompass 10 different surgical specialties. The model also features the dynamic sequencing rules that will be used to break the tie between delayed surgical procedures competing for surgical resources. Based on the set of the surgical schedules obtained, by employing Mixed Integer Linear Programming (MILP) approach, a heuristic algorithm is applied. Figure 1(a) presents the typical flow of elective patients in the OR and downstream units and Figure 1(b) provides the information on flowchart of the constructive heuristic approach based on genetic algorithm that would be used on deciding the starting time of surgical operation.



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