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A hybrid genetic approach for solving an integrated multi-objective operating room planning and scheduling problem

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Abstract

In this paper, we propose a multi-objective integer linear programming model aiming at efficiently planning and managing hospital operating room suites. By effectively exploiting a novel hybrid genetic solution approach, the devised optimization model is able to determine, in an integrated way, (i) the operating room time assigned to each surgical specialty, (ii) the operating room time assigned to each surgical team, (iii) the surgery admission planning and (iv) the surgery scheduling. The resulting Pareto frontiers provide a set of “optimal” solutions able to support hospital managers in efficiently orchestrating the involved resources and planning surgeons and surgeries. On this basis, the proposed solution framework could represent a suitable engine for the development of advanced and effective health care management decision support systems.

Keywords: Multicriteria Optimization, Integer Linear Programming, Genetic Algorithms, Optimization in Healthcare Services

1. Introduction

In the wide context of hospital healthcare activities, complex decision making processes strongly affect operating theatre (OT) organization and management, high dynamic environments where the first priority is to ensure a safe and efficient surgery scheduling. It is well known that

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