Pharos
Revista de la Facultad de Ingeniería

Karen Niño[a], Diana López-Soto[b]

[a] Department of Industrial Engineering, Universidad Militar Nueva Granada

[b] Department of Industrial & Manufacturing Engineering, North Dakota State University

Resource allocation in healthcare using a Multi-mode Resource Constrained Project Scheduling Problem

Healthcare management has received wide attention from research during the last decades, nowadays this interest in the topic has increased due to the last pandemic by COVID. This milestone made the resources allocation and scheduling problem in this area even worse, especially in those services where there is high permanent demand from patients such as specialized medical procedures for the treatment of serious illness. This latter because of high constraints and preferences because each patient has specific needs, as well as the well-known limited resources (medical facilities, medical personnel, appointment availability, among others) there are in healthcare.

Accordingly, the accurate allocation of these resources in the attention of patients' needs is considered a real challenge which has been addressed from several approaches to generate added value for patients specially related to suitable service time. Thus, the resource allocation and scheduling problem have focused mainly on nurse scheduling problems, medical personnel scheduling problem, admission scheduling problem, scheduling of patients' appointments, among others. Therefore, this research proposes a multi-mode resource constrained project scheduling problem with time lags for resource allocation in healthcare services. Minimization of makespan and maximization of quality are the objectives to be minimized. The results were benchmarked, and they show accuracy on the problem solution as well as the possibility to be applied in real scenarios.

Key Words:

Project scheduling problem, Healthcare, Makespan, Time-lags, Bi-objective, Metaheuristics.