

## An Efficient Decomposition Approach for Surgical Planning

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This talk presents an efficient decomposition approach to surgical planning. Given a set of surgical waiting lists (one for each discipline) and an operating theater, the problem is to decide the room-to-discipline assignment for the next planning period (Master Surgical Schedule), and the surgical cases to be performed (Surgical Case Assignment), with the objective of optimizing a score related to priority and current waiting time of the cases. While in general MSS and SCA may be concurrently found by solving a complex integer programming problem, we propose an effective decomposition algorithm which does not require expensive or sophisticated computational resources, and is therefore suitable for implementation in any real-life setting.

Our decomposition approach consists in first producing a number of subsets of surgical cases for each discipline (potential OR sessions), and select a subset of them. The surgical cases in the selected potential sessions are then discarded, and only the structure of the MSS is retained. A detailed surgical case assignment is then devised filling the MSS obtained with cases from the waiting lists, via an exact optimization model.

The quality of the plan obtained is assessed by comparing it with the plan obtained by solving the exact integrated formulation for MSS and SCA. Nine different scenarios are considered, for various operating theater sizes and management policies. The results on instances concerning a medium-size hospital show that the decomposition method produces comparable solutions with the exact method in much smaller computation time.