

Iterated Local Search Heuristic for The Seating Arrangement Layout Problem

Bruna Cristina Braga Charytitsch

Universidade Federal de São Paulo (UNIFESP)
Av. Cesare M. G. Lattes, 1201, São José dos
Campos-SP, 12247-014, Brazil
bcbraga@unifesp.br

Mariá Cristina Vasconcelos Nascimento

Instituto Tecnológico de Aeronáutica (ITA)
Praça Marechal Eduardo Gomes,
Vila das Acácias, 50, São José dos Campos -SP,
12228-900, Brazil
mariah@ita.br

ABSTRACT

This work introduces the Seating Arrangement Layout Problem (SALP), an optimization challenge that seeks to allocate students to classroom seats while minimizing interpersonal conflicts. A mathematical model has been developed to formalize the problem, incorporating key constraints such as minimum spacing between students and predefined seating preferences. The objective is to maximize the distance between students with potential conflicts while fully respecting all restrictions. Since traditional optimization methods work well for small instances but become impractical as problem size increases, we propose an Iterated Local Search (ILS) heuristic to solve SALP. The ILS builds an initial solution based on a weight matrix that reflects undesired proximities and iteratively refines it through perturbation and local search phases. Computational experiments using real-world scenarios demonstrate that the heuristic efficiently produces high-quality solutions. Notably, in highly conflicted classrooms, multiple ILS runs improved feasibility and significantly reduced proximity among conflicting students. Future work includes refining local search strategies and making the heuristic available as user-friendly software to assist teachers in a task typically done manually.

KEYWORDS. Metaheuristics, Iterated Local Search, Seating Arrangement, Combinatorial Optimization, Educational Tools.