

A Multi-Objective Approach to Road Network Planning

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Road network planning is a subject of research being pursued at the Department of Civil Engineering of the University of Coimbra since the mid-90s. The first years devoted to the subject were dedicated to the development of models for maximizing accessibility to urban centers. These early models were solved with local search and simulated annealing algorithms. Progressively, new objectives have been introduced into the models, including robustness and equity. Also, new solution methods have been tested, including variable neighborhood search and enhanced genetic algorithms. At present, a sophisticated multi-objective approach to road network planning is available. The approach considers multi-level roads and elastic travel demand, and is consistent with the Highway Capacity Manual planning framework. In this paper we describe the work already made to develop the approach, compare it with the work currently being carried out in leading research centers of the world, and identify directions for further investigation. The type of results that can be obtained from the application of the approach is illustrated for the road networks of Portugal and Poland.

Keywords: road network; multi-objective optimization; equity; robustness; Highway Capacity Manual.