

Modelle und Lösungsverfahren für die integrierte Ressourceneinsatzplanung im öffentlichen Personennahverkehr

Vitali Gintner

Due to the increasing privatisation of the public transport market in Germany and drastic reduction of the subsidies, an economical and efficient use of given resources is crucial for public transport companies. In order to manage such a complex task, they often use computed-aided planning tools based on the mathematical optimization. However, such tools pursue a sequential approach similar to the manual planning: vehicle scheduling first and crew scheduling afterwards. This process can restrict the solution space. On the contrary, the integration of both planning steps provides additional flexibility that can lead to the gains in efficiency.

This thesis deals with the development and analysis of several models and solution approaches which can be applied to solve integrated vehicle and crew scheduling problems with multiple depots considering a variable degree of integration. In addition to a complete integration of both planning problems, a new partial integrated approach is presented. It outperforms the traditional sequential planning, and is applicable for large problem instances. Furthermore, all presented approaches can be combined with each other offering a flexible framework for solving vehicle and crew scheduling problems with different requirements on the solution time and quality.