



Modeling an Integrated Public Transportation System - a case study in Dublin, Ireland

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Abstract

The efficiency of the public transport system in any city depends on integration of its major public transport modes. Suburban railway and public buses are the modes normally used by the majority of commuters in metropolitan cities of developed and developing countries. Integration of these two services reduces overall journey time of an individual. In this research, a model is developed for operational integration of suburban trains and public buses. The model has two sub models: a Routing Sub Model and a Scheduling Sub Model. In the Routing Sub Model, feeder routes are generated for public buses which originate from a railway station. A Heuristic Feeder Route Generation Algorithm is developed for generation of feeder routes. In the Scheduling Sub Model, optimal coordinated schedules for feeder buses are developed for the given schedules of suburban trains. As a case study the Dun Laoghaire DART (Dublin Area Rapid Transit) (heavy rail suburban service) station of Dublin in Ireland is selected. Feeder bus services are coordinated with existing schedules of the DART on the developed feeder route network. Genetic Algorithms, which are known to be a robust optimization technique for this type of problem, are used in the Scheduling Sub Model. Finally the outcome of the research is a generated feeder route network and coordinated services of feeder buses on it for the DART station.

Keywords: Coordinated schedules, Genetic algorithms, Modal integration, Optimization, Public transportation, Routing and scheduling.

1. Introduction

It has been observed that most of the metropolitan cities of developed and developing countries are facing problems due to lack of coordination among public transport facilities. Each public transport facility is planned and designed without considering its

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