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Cyclic Railway Timetabling: a Stochastic Optimization Approach

Thursday, Nov. 17, 2005
3:00 – 4:00 pm

Location:
McCormick School of Engineering,
2145 Sheridan Rd., Evanston
Lecture Room 4 (M113)

Abstract: Real-time railway operations are subject to stochastic disturbances. However, a railway timetable is a deterministic plan. Thus a timetable should be designed in such a way that it can absorb the stochastic disturbances as well as possible. To that end, a timetable contains buffer times between trains and supplements in running times and dwell times. This presentation first describes a stochastic optimization model that can be used to find an optimal allocation of the running time supplements of a single train on a number of consecutive trips along the same line. The aim of this model is to minimize the average delay of the train. The model is then extended such that it can be used to improve a given cyclic timetable for a number of trains on a common infrastructure. Computational results show that the average delay of the trains can be reduced substantially by applying relatively small modifications to the timetable. In particular, allocating the running time supplements in a different way than what is usual in practice can be useful.

Bio: Rommert Dekker is a full-time professor of Operations Research and Quantitative Logistics at the Erasmus School of Economics, Erasmus University Rotterdam. He has an MSc and PhD in operations research from the University of Leiden and a MSc in industrial engineering from Twente University of Technology. After his PhD he worked for 7 years with Shell Research on maintenance optimization and refinery logistics.

His research interests cover a wide range of logistic problems, viz. reverse logistics, maintenance optimization, (spare parts) inventory control, container logistics and transportation. He has written more than 75 papers in scientific journals, with the majority in the European Journal of Operational Research, but others in Math of OR, Management Science, Transportation Science and Interfaces. He received the Goodeve medal for the best applied paper in JORS and the ERIM impact award for his studies on reverse logistics. He has done consultancy for many companies, including Shell, Siemens, Vopak, Europe Combined Terminals and the Dutch Railways. He has led a large EU project on Reverse Logistics and is presently leading a project on service logistics with several Dutch companies.