

SCCER Mobility Seminars



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Challenges of Energy-Saving Automatic Train Operation by Maximal Usage of Regenerating Brakes in Japanese Urban Railways

**Thursday, 7 December 2017, 4:15 pm at ETH Zürich, followed by an Apéro
LEE D 105 (LEE-building, D-floor, room 105)**

Abstract

This seminar summarizes the theoretical as well as experimental challenges in Japan to schedule train running profile for energy-saving and to apply automatic train operation technology. The goal is to realize energy-saving train operation by keeping the traveling time constant. The physical principle of energy-saving operation is that maximal usage of coasting at high speed and power limiting regenerating brakes.

If the track profile is complicated, there is no straightforward way to find the energy-saving running profile. In such cases, mathematical optimization is a powerful tool. This talk will also briefly explain the applicability of two mathematical approaches: parametric control-input optimization and dynamic programming.

In an experimental case study at a linear metro line in Japan, an energy-saving effect of more than 16 % was achieved in 2015. These results and experiences show technical feasibility of the proposed approach and the challenges that need to be solved for further improvement.

Biography

Takafumi Koseki received his PhD degree in electrical engineering from the University of Tokyo, Japan, in 1992. Currently, he is professor in the Department of Electrical Engineering and Information Systems at the University of Tokyo. His present research interests include public transport systems, particularly linear drives, as well as the analysis and control of traction systems. He is a member of IEEE, the Institute of Electrical Engineers of Japan (IEEJ), the Japan Society of Mechanical Engineering, the Japan Society of Applied Electromagnetic and Mechanics, the Japan Society of Precision Engineering, Japan Railway Electrical Engineering Association and International Association of Railway Operations Research (IAROR).

The seminar is organized by the Swiss Competence Center for Energy Research (SCCER) for Efficient Technologies and Systems for Mobility. We appreciate your registration until **1 December 2017** using the [doodle link](#) or contact fiorella.meyer@sccer.ethz.ch.



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