

JSPS Summer Program 2013

Orientation Session at Sokendai

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Abstracts for the Poster Presentation

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Power Optimization of Linear Motor Elevators using Computational Intelligence Methods

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Modern high-rise buildings use safe and energy efficient traction elevators. However, this technique has two drawbacks: (1) Traction elevators are not space efficient and (2) not flexible. The impact of a linear motor elevator (LME) system is huge, because it allows a much more efficient utilization of the expensive urban land space. The evaluator can work not only in a straight line, but also in an arbitrary trajectory. However, these systems must be balanced with acceptable energy efficiency.

Therefore, the four project partner universities from Turkey, Japan and Germany are developing and building a full-scale LME prototype. In order to intensify my present research, the starting point at the KIC will be the analysis of energy aspects of a LME system. This involves developing a simulation model that includes the electromechanical model of the elevator drives, the power network of the building and several sensors. Using this model we will analyze the energy consumption of the total system, including the building's heating, ventilation, and air conditioning network. Further, we will optimize energy consumption using Computational Intelligence (CI) methods like Sequential Parameter Optimization, which is a tuner for CI-based optimization algorithms. The optimum will be selected based on the Pareto efficiency.