

## **Hybrid Simulation Method for Catenary/Pantograph System**

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There are several ways to evaluate dynamic performance of a pantograph. A rigorous evaluation can be accomplished by means of on-track tests, but they might have a lot of restrictions on the measurement and change in test parameters and can generally be costly. The test facilities which are the properties of Railway Technical Research Institute allow us to conduct various tests and have been contributing to R&D activities for the pantograph. Simulation tools for catenary/pantograph system can also be used for evaluating the pantograph performance. The test facilities and simulation tools are not accurate enough to evaluate the pantograph performance in some cases due to the operation limits of the facilities (maximum speed etc.) or modelling errors in the simulation. In order to develop a pantograph testing system by which various tests can be conducted in a low cost way and with satisfactory accuracy, we've been working on developing a hybrid simulation method which is the combination of an actual pantograph and a numerical catenary. We found out that the test system presented in the last report is applicable only to the catenary model with high damping. In this report, a stabilization method for the system is presented. This method enables the system to be operated stably even for the catenary model with low damping.