The results of the pantograph-catenary interaction benchmark

Abstract— This paper describes the results of a voluntary benchmark initiative concerning the simulation of pantograph-catenary interaction, which was proposed and coordinated by Politecnico di Milano and participated by 10 research institutions established in 9 different countries across Europe and Asia. The aims of the benchmark are to assess the dispersion of results on the same simulation study cases, to demonstrate the accuracy of numerical methodologies and simulation models and to identify the best suited modelling approaches to study pantograph-catenary interaction. One static and three dynamic simulation were defined for non-existing but realistic high-speed cases a pantograph-catenary couple. These cases were run using 10 of the major simulation codes presently in use for the study of pantograph-catenary interaction, and the results are presented and critically discussed here. All input data required to run the study cases are also provided, allowing the use of this benchmark as a term of comparison for other simulation codes.

Index Terms— pantograph, catenary, dynamic interaction, benchmark problems, multi-body dynamics, finite element method

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Citation:

"The results of the pantograph-catenary interaction benchmark", Vehicle System Dynamics: International Journal of Vehicle Mechanics and Mobility, vol., no., pp.-., .