**Hybrid Simulation of Pantograph-Catenary Systems based on Multi Degree-of-Freedom Catenary Model**

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This study presented a hybrid simulation (HS) method for pantograph/catenary systems based on dynamically substructured system (DSS). In this method, contact force between an actual pantograph and a hydraulic actuator is utilized to calculate the motion of the catenary in real-time, and the actuator is driven according to the calculated motion of the catenary. The advantage of the proposed method, compared with the commonly-used method, is that DSS is able to avoid instability that can be caused by delay characteristics of the actuator. The proposed method is able to accurately represent dynamic interaction between the pantograph and the catenary. In this paper, the DSS methodology is introduced firstly, then the proposed method is validated based on simulation and experiment.