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A Full-Train with Inerters: Stability and Performance

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Abstract

This paper discusses the use of inerters to improve the stability and performance of a thirty-seven degree-of-freedom full-train model. We build the nonlinear full-train model in AutoSim, and obtain the linearised model for analysis in Matlab. We consider three basic suspension layouts, and optimize the suspension parameters for two indexes: the critical speed and passenger's comfort. From the optimization results, inerters are deemed effective in improving the stability and performance of the full-train system.