

Influence of Excitation Condition on Evaluating the Critical Hunting Speed

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Hunting of a railway vehicle is the self-excited oscillation, which is unfavorable to the running stability of the vehicle because it can generate relatively large lateral forces between the wheels and the tracks. In order to verify the running stability of a train bogie, we usually conduct a hunting motion test on the roller rigs. The test has two types: a simple rotation test and an excitation test. It is well known that the critical hunting speed can vary depending on the way of excitation. Therefore, we experimentally investigated how the waveform of roller the rigs influenced the critical hunting speed, and we confirmed that whether the hunting oscillation would occur or not depended on the initial lateral amplitude of the free oscillation that was generated by the excitation. In this paper, we reported the results of the hunting motion tests, then examined them from the viewpoint of the global stability of hunting oscillation. In addition, we pointed out an analogy between the hunting oscillation and a bifurcation phenomenon that is known to occur in a nonlinear system.