Analysis of Hunting Stability Using Method for Calculating Periodic Solution

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In order to evaluate the vehicle running stability, hunting motion test is commonly conducted using a real bogie on roller rigs. Hunting motion occurs at a certain speed without any disturbance. However, even below the critical hunting speed, hunting motion can occur when disturbance is applied. Our previous studies have shown that there exists a clear point where initial lateral displacement of wheelset causes hunting motion and the point originates from unstable limit cycle. Therefore, we applied a shooting method, which can calculate periodic solution for nonlinear system, to obtain an unstable limit cycle. This paper reports summary of the shooting method and its application for vehicle dynamics model, then examines the validity of the result obtained by the method.