

Linear Complementary Based Approach for Unilateral Frictional Contact between Wheel and Beam

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Abstract : The present paper aims to investigate a suitable contact between a wheel rolling over a flexible beam. A Linear Complementary (LCP) based approach has been adopted to simulate the contact dynamics for a rigid wheel traversing over a flexible Euler Bernoulli simply supported beam. The adopted methodology is suitable to incorporate the effect of frictional force acting at the wheel-beam interface. Moreover, the possibility of the generation of a gap between the two bodies has also been considered. The present method is based on a unilateral contact assumption which assumes that no penetration would occur when the two bodies come in contact. This assumption helps to predict the contact between wheels and beams in a more practical sense. The proposed methodology is validated with the previously published results and is found to be in good agreement. Further, this method is applied to simulate the contact between wheels and beams for various railway configurations. Moreover, different parametric studies are conducted to study the contact dynamics between the wheel and beam more thoroughly.

Keywords : contact dynamics, linear complementary problem, railway dynamics, unilateral contact

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