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The Continuously Supported Infinity Rail Subjected to a Moving Complex Bogie System

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Abstract : The vibration of a complex bogie system that moves on along the high order shear deformable beam on a viscoelastic foundation is studied. The complex bogie system has been modeled by elastically connected rigid bars on an identical supports. Elastic coupling between bars is introduced to simulate rigidly or flexibly (transversal or/and rotational) connection. Identical supports are modeled as a system of attached spring and dashpot to the bar on one side and interact with the beam through the concentrated mass on the other side. It is assumed that the masses and the beam are always in contact. New analytically determined critical velocity of the system is presented. It is analyzed the case when the complex bogie system exceeds the minimum phase velocity of waves in the beam when the vibration of the system may become unstable. Effect of an elastic coupling between bars on the stability of the system has been analyzed. The instability regions are found for the complex bogie system by applying the principle of the argument and D-decomposition method.

Keywords : Reddy-Bickford beam, D-decomposition method, principle of argument, critical velocity
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