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Dynamic Analysis and Vibration Control of The Planar Beams Moving Along the Axial Direction

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In this paper, dynamic simulation method and vibration control technique are proposed for flexible body moving along the axial direction, such as the plates and the wire rods in the mill. At first, for the purpose of analyzing the dynamics of this flexible body, the FEM beam model that takes account of the movement of the axial direction and geometric nonlinearity is proposed. Calculation result shows that the vibration phenomena appears when the cantilever beam is pulled into the fixed area. Next, the optimal damper-spring support property for controlling the vibration of the beam is obtained by the complex eigenvalue analysis. Finally, the vibration control method is proposed and the effect of the control is verified by numerical simulation using the finite element model proposed above. In the consequence, it is verified that the vibration of the beam are reduced by the proposed vibration control method.

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