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Forced Vibration of a Planar Curved Beam on Pasternak Foundation

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Abstract : The objective of this study is to investigate the forced vibration analysis of a planar curved beam lying on elastic foundation by using the mixed finite element method. The finite element formulation is based on the Timoshenko beam theory. In order to solve the problems in frequency domain, the element matrices of two nodded curvilinear elements are transformed into Laplace space. The results are transformed back to the time domain by the well-known numerical Modified Durbin's transformation algorithm. First, the presented finite element formulation is verified through the forced vibration analysis of a planar curved Timoshenko beam resting on Winkler foundation and the finite element results are compared with the results available in the literature. Then, the forced vibration analysis of a planar curved beam resting on Winkler-Pasternak foundation is conducted.

Keywords : curved beam, dynamic analysis, elastic foundation, finite element method
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