

Instability and vibration control by means of piezoceramic element

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Abstract: The control of vibration frequency and stability of slender systems is a very important issue in engineering. The control phenomenon can be realized with the use of different methods, while prestressing is one of them. In this paper, the studies on an influence of the prestressing caused by a force generated by a piezoceramic element on stability and vibrations of a multi-member column subjected to the specific load are presented. At this load one can find divergence and divergence-pseudoflutter shapes of the characteristic curves. The boundary problem is formulated by use of Hamilton's principle on the basis of which the differential equations of motion as well as natural boundary conditions are obtained. The main goal of this study is to find such a magnitude of the prestressing force at which the control of vibration frequency can be done as well as the change of instability regions at different parameters of the loading unit.

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