

عنوان مقاله:

Buckling of an Arbitrary Number of Parallel Timoshenko Beams with Intermediate Flexible Connections Under a Compressive Axial Force

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نویسندگان:

Saeed Foroozande - Department of Mechanical Engineering, Faculty of Engineering, University of Isfahan, Iran

Alireza Ariaei - Department of Mechanical Engineering, Faculty of Engineering, University of Isfahan, Iran

خلاصه مقاله:

Buckling analyzing of a set of parallel Timoshenko beams that are connected together by intermediate flexible connections is studied in this article. In order to investigate the buckling, the parallel beams are under an axial force. In this case, a suitable set of equations is created that are applicable to solve the problems of axial loading. The number of beams and intermediate connections are arbitrary and are considered as parameters n and m respectively. The existence of the intermediate connections needs compatibility equations which create coupled differential equations along with the Timoshenko beams. The solving method involves a change of variables to decouple the governing differential equations. The eigenvalues and the eigenfunctions are obtained adopting transfer matrix method. Natural frequencies of the beams are obtained by increasing the axial force and different stiffness of the connections. It is observed that by increasing the axial force, the natural frequencies decrease and the first frequency of the beams equals zero at the critical buckling force and at this value of force, the buckling is started. Then the values of the critical axial force are shown for increasing the length of the beams and increasing the stiffness of the connections.

کلمات کلیدی:

Parallel Timoshenko Beams, Intermediate Flexible Connections, Transfer Matrix Method, Axial Force, Critical Buckling Force

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