

عنوان مقاله:

Thermo-mechanical nonlinear vibration analysis of fluidconveying structures subjected to different boundary conditions using Galerkin-Newton-Harmonic balancing method

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خلاصه مقاله:

The development of mathematical models for describing the dynamic behaviours of fluid conveying pipes, micro-pipes and nanotubes under the influence of some thermo-mechanical parameters results into nonlinear equations that are very difficult to solve analytically. In cases where the exact analytical solutions are presented either in implicit or explicit forms, high skills and rigorous mathematical analyses were employed. It is noted that such solutions do not provide general exact solutions. Inevitably, comparatively simple, flexible yet accurate and practicable solutions are required for the analyses of these structures. Therefore, in this study, approximate analytical solutions are provided to the nonlinear equations arising in flow-induced vibration of pipes, micro-pipes and nanotubes using Galerkin-Newton-Harmonic Method (GNHM). The developed approximate analytical solutions are shown to be valid for both small and large amplitude oscillations. The accuracies and explicitness of these solutions were examined in limiting cases to establish the suitability of the method

کلمات کلیدی:

Thermo-mechanical; Non-linear Vibration; Galerkin's method; Newton-Harmonic Balancing Technique; Fluid-conveying structure

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