عنوان مقاله:

Fluid structure interaction effect on vibration of conveyed coupled composite microtubes reinforced by Boron-Nitride nanotube

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خلاصه مقاله:

In this study the nonlinear vibration in a coupled system of Boron-Nitride nano-tube reinforced composite (BNNTRC)micro-tubes conveying viscous fluid is investigated. Single-walled Boron-Nitride nano-tubes (SWBNNTs) are arrangedin a longitudinal direction inside Poly-vinylidene fluoride (PVDF) matrix. Based on piezoelectric fiber reinforcedcomposite (PFRC) theory, properties of BNNTRC micro-tubes are obtained. Damping and shearing effects of surroundedmedium are taken into account by visco-Pasternak model. To enhance the accuracy of results, the effect of slip flowregime is considered. Strain gradient theory is developed in cylindrical shell model to obtain the motion equations.Results indicated that, Knudsen number is a key parameter on critical flow velocity and stability of coupled system.Results of this investigation can be applied for optimum design of micro/nano-electro-mechanical .systems(MEMS/NEMS) such as shell and tube heat exchangers in micro scale

کلمات کلیدی:

Composite micro-tubes, Visco-Pasternak foundation, Strain gradient theory, Knudsen number