

Optimal Auxiliary Functions Method for nonlinear free vibration of microtubes

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Abstract: In this paper, the microfluid-induced nonlinear free vibration of microtubes is studied by means of a new analytical technique, namely the Optimal Auxiliary Functions Method (OAFM). The the nonlinear equation of motion is obtained after some developments based on Hamilton's principle and a modified couple stress theory. Explicit and accurate approximate analytical solutions are obtained using the proposed technique. The influence of internal material length scale parameter, outer diameter and flow velocity on the dynamic behaviour is presented.

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