



Nonlinear normal vibration modes in pendulum systems

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Abstract: Concept of nonlinear normal modes (NNMs) by Kauderer and Rosenberg is used. This concept is based on construction of trajectories in the system configuration space. In the spring pendulum dynamics the modes of longitudinal motions and of coupled longitudinal and angle motions, are analyzed by the NNM approach for any vibration amplitudes. Stability of two NNMs is investigated. Two-DOF system which contains the pendulum absorber is considered. Localized and non-localized NNMs are selected. If the localized mode is realized, the system energy is concentrated in the absorber. It is shown that this mode is stable in wide range of the system parameters. Resonance forced vibrations of the system is developed by the NNM approach and the modified Rausher method, when the non-autonomous system is reduced to the "pseudo-autonomous" one. Frequency responses are obtained. References 1. Vakakis A., Manevitch L., Mikhlin Yu., Pilipchuk V., Zevin A. (1996) Normal Modes and Localization in Nonlinear Systems. Wiley, NY. 2. K.V.Avrarov and Yu.V.Mikhlin (2010) Nonlinear Dynamics of Elastic Systems.Regular and Chaotic Dynamics, Moscow-Izhevsk (in Russian).

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