عنوان مقاله:

DYNAMIC EXPERIMENTAL TESTING SETUP AND EVALUATION FOR NON-LINEAR RESONANT DECAY METHOD (NLRDM

محل انتشار:

دومین کنفرانس بین المللی آکوستیک و ارتعاشات (سال: 1391)

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خلاصه مقاله:

The previous papers have discussed the theoretical and simulation behaviour of NL-RDM. In this paper preparations for the dynamic experimental testing and evaluation are explored. Any ex-perimental rig used to evaluate NL-RDM would be required to meet certain criteria. Any rig would have to be a multi-DOF setup in order to begin to evaluate the abilities of the method to analyse similar models. So, the rig is introduced and some information about instrumentation and data ac-quisition provided. Parts of the rig will be tested statically and dynamically. The system tested was a 2DOF lumped parameter linear system to which a nonlinear element was added, in the form of a clamped-clamped beam. The beam was evaluated for the degree of nonlinearity present and its suit-ability to be tested experimentally as a cubic stiffening spring.The system was tested using random excitation and FRFs were obtained for analysis. FRFs showed a clear shift in natural frequency for rising levels of excitation, demonstrating clear harden-ing stiffness non-linearity. The system was also tested using stepped sine excitation and FRFs again obtained. The results showed clear ‘jumps’ at higher levels of excitation, again demonstrating that non-linearity was present.The experimental rig is evaluated in relation to the degree of non-linearity present, linearity at low force vibration levels, degree of noise present and other variables that may affect the test re-sults, as discussed in other papers. Additionally other more general problems in testing are dis-cussed and where possible solutions proposed. .Following this evaluation a final design is proposed for adoption in the testing phase

کلمات کلیدی:

Nonlinear System Identification; NL-RDM; FRF; Experimental Vibration