

ALL DATABASES

[<< Back to results list](#)Record 1 of 1 [▶](#)

Vibration analysis of a continuous system subject to generic forms of actuation forces and sensing devices

[Full Text](#)[Print](#) [E-mail](#) [Add to Marked List](#) [Save to EndNote@Web](#) [Save to EndNote, RefMan, ProCite](#) [more options](#)**Author(s):** Wang BT (Wang, Bor-Tsuen)**Source:** JOURNAL OF SOUND AND VIBRATION **Volume:** 319 **Issue:** 3-5 **Pages:** 1222-1251 **Published:** JAN 23 2009**Times Cited:** 0 **References:** 56 [Citation Map](#)

Abstract: This work provides a general formulation to solve vibration problems for continuous systems with damping effects, including modal, transient, harmonic and spectrum response analyses. In modal analysis, the system eigenvalues and corresponding eigenfunctions can be determined. The orthogonal relations of eigenfunctions are shown. For transient, harmonic and spectrum analyses, the generic force/actuator functions and response/sensing operators are introduced respectively, and used to derive the system response. The time domain response is obtained for transient analysis, the frequency response function is derived for harmonic analysis and statistical quantiles of response variables due to random excitation are determined in spectrum analysis. The solution for each type of analysis can be formulated and expressed in a concise format in terms of generic force/actuator and response/sensor mode shape functions. In particular, one-dimensional beam and two-dimensional plate vibration analyses are illustrated by following the developed generic formulation. This work provides the complete analytical solutions of four types of vibration analyses for continuous systems and can be applied to other engineering structures as well. (C) 2008 Elsevier Ltd. All rights reserved.

Document Type: Article**Language:** English**KeyWords Plus:** STEADY-STATE RESPONSE; RECTANGULAR-PLATES; TRANSVERSE VIBRATIONS; RANDOM-EXCITATION; CANTILEVER BEAM; MODAL-ANALYSIS; TIP MASS; PART 1; PIEZOCERAMIC TRANSDUCERS; ORTHOTROPIC PLATES**Reprint Address:** Wang, BT (reprint author), Natl Pingtung Univ Sci & Technol, Dept Mech Engr, Pingtung 91207, Taiwan**Addresses:**

1, Natl Pingtung Univ Sci & Technol, Dept Mech Engr, Pingtung 91207, Taiwan

E-mail Addresses: wangbt@mail.npust.edu.tw**Publisher:** ACADEMIC PRESS LTD ELSEVIER SCIENCE LTD, 24-28 OVAL RD, LONDON NW1 7DX, ENGLAND**IDS Number:** 390MV**ISSN:** 0022-460X**DOI:** 10.1016/j.jsv.2008.06.037