Record Nr. UNINA9910139038303321 Autore Shen Hui-Shen Titolo A two-step perturbation method in nonlinear analysis of beams, plates, and shells [[electronic resource] /] / Hui-Shen Shen Singapore, : John Wiley & Sons, 2013 Pubbl/distr/stampa 1-118-64991-5 **ISBN** 1-118-64989-3 1-118-64990-7 Descrizione fisica 1 online resource (369 p.) Collana Information security series Disciplina 624.1/82015157248 Girders - Mathematical models Soggetti Shells (Engineering) - Mathematical models Plates (Engineering) - Mathematical models Deformations (Mechanics) - Mathematical models Perturbation (Mathematics) Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Description based upon print version of record. Note generali Nota di bibliografia Includes bibliographical references and index. Nota di contenuto A Two-Step Perturbation Method in Nonlinear Analysis of Beams, Plates and Shells; Contents; About the Author; Preface; List of Symbols; 1 Traditional Perturbation Method; 1.1 Introduction; 1.2 Load-type Perturbation Method; 1.3 Deflection-type Perturbation Method; 1.4 Multi-parameter Perturbation Method; 1.5 Limitations of the Traditional Perturbation Method; References; 2 Nonlinear Analysis of Beams; 2.1 Introduction; 2.2 Nonlinear Motion Equations of Euler-Bernoulli Beams; 2.3 Postbuckling Analysis of Euler-Bernoulli Beams: 2.4 Nonlinear Bending Analysis of Euler-Bernoulli Beams 2.5 Large Amplitude Vibration Analysis of Euler-Bernoulli BeamsReferences; 3 Nonlinear Vibration Analysis of Plates; 3.1 Introduction; 3.2 Reddy's Higher Order Shear Deformation Plate Theory; 3.3 Generalized Karman-type Motion Equations; 3.4 Nonlinear Vibration of Functionally Graded Fiber Reinforced Composite Plates; 3.5 Hygrothermal Effects on the Nonlinear Vibration of Shear Deformable

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## Sommario/riassunto

The capability to predict the nonlinear response of beams, plates and shells when subjected to thermal and mechanical loads is of prime interest to structural analysis. In fact, many structures are subjected to high load levels that may result in nonlinear load-deflection relationships due to large deformations. One of the important problems deserving special attention is the study of their nonlinear response to large deflection, postbuckling and nonlinear vibration. A two-step perturbation method is firstly proposed by Shen and Zhang (1988) for postbuckling analysis of isotropic plat