

Frequency Domain Methods For Nonlinear Analysis Theory And Application

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Frequency Domain Methods For Nonlinear

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A new frequency domain method for nonparametric identification of nonlinearities in dynamic systems is presented. • The so-called describing surface method is based on response controlled stepped sine test. • Nonlinear stiffness and damping values are identified as a function of vibration amplitude and frequency. •

A frequency domain nonparametric identification method for ...

This paper provides a comparative overview of four classes of frequency domain methods for nonlinear systems: Volterra based models, nonlinear frequency response functions / Bode plots, describing functions and linear approximations in the presence of nonlinearities.

A comparative overview of frequency domain methods for ...

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Frequency-Domain Methods for Nonlinear Analysis Theory and ...

This paper provides a comparative overview of four classes of frequency domain methods for nonlinear systems: Volterra based models, nonlinear frequency response functions / Bode plots, describing functions and linear approximations in the presence of nonlinearities.

A comparative overview of frequency domain methods for ...

linearized frequency domain solver, where the modes are coupled and require simultaneous solution of both the time-averaged and unsteady terms. Although some of the nonlinearities are addressed in the time-averaged solution, the higher order terms are still neglected in the solution of the unsteady modes. In addition, the

Demonstration of Nonlinear Frequency Domain Methods

A wave-vector-frequency-domain method is presented to describe one-directional forward or backward acoustic wave propagation in a nonlinear homogeneous medium. Starting from a frequency-domain representation of the second-order nonlinear acoustic wave equation, an implicit solution for the nonlinear term is proposed by employing the Green's function.

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Evaluation of a wave-vector-frequency-domain method for ...

Harmonic balance is a method used to calculate the steady-state response of nonlinear differential equations, and is mostly applied to nonlinear electrical circuits. It is a frequency domain method for calculating the steady state, as opposed to the various time-domain steady state methods. The name "harmonic balance" is descriptive of the method, which starts with Kirchhoff's Current Law written in the frequency domain and a chosen number of harmonics.

Harmonic balance - Wikipedia

For nonlinear systems, frequency-domain analysis methods from time-domain models include the generalised frequency response functions (GFRFs) and the nonlinear output frequency response functions (NOFRFs), which both aid in analysing phenomena such as sub- and super-harmonics as well as resonances and energy transfer between frequencies,.

Frequency-domain analysis for nonlinear systems with time ...

The nonlinear time-domain method is used for validations of two frequency domain methods: nonlinear harmonic and phase solution method. A typical time-domain solver run for this case takes about 3 days on a single CPU with a 2 GHz Intel Xeon CPU.

Comparison of Frequency Domain and Time-Domain Methods for ...

Frequency-Domain Methods for Nonlinear Analysis: Theory and Applications. Edited by LEONOV G A ET AL. Published by World Scientific Publishing Co. Pte. Ltd.

Frequency-Domain Methods for Nonlinear Analysis: Theory ...

cells to spatio-temporal patterns of light. We have developed a novel method of nonlinear analysis that has been used to probe the internal structure of this network (Victoretal., 1977). The crux of this method is the use of a modulation signal that is a sum of sine waves and the measurement of the nonlinear response of the system as cross-talk between the input frequencies.

A method of nonlinear analysis in the frequency domain

The computational model and methods are firstly described. Then, extensive validations of the frequency-domain method against both experimental data and the nonlinear time-domain solutions are described. Finally, the computational analysis and demonstration of the intrarow reflection effects on the rotor aerodynamic damping are presented.

Nonlinear Time and Frequency Domain Methods for Multirow ...

Soil-structure interaction (SSI) analysis is generally a required step in the calculation of seismic demands in nuclear structures, and is currently performed using linear methods in the frequency domain. Such methods should result in accurate predictions of response for low-intensity shaking, but their adequacy for extreme shaking that results in highly nonlinear soil, structure or foundation response is unproven.

Frequency- and Time-Domain Methods in Soil-Structure ...

Abstract A method is developed for the analysis of nonlinear biological systems based on an input temporal signal that consists of a sum of a large number of sinusoids. Nonlinear properties of the system are manifest by responses at harmonics and intermodulation frequencies of the input frequencies.

A method of nonlinear analysis in the frequency domain.

Frequency domain methods for nonlinear systems have also been investigated for many years. There have already been several different approaches to the analysis and design for nonlinear systems, such as describing functions (Graham and McRuer 1961, Nuij et al 2006), harmonic balance (Solomou et al 2002), and frequency domain methods

Nonlinear influence in the frequency domain: alternating ...

Two widely used semi-analytical methods: the incremental harmonic balance (IHB) method and alternating frequency/time-domain (AFT) method are compared, and some long-standing discussions on frameworks of these two methods are cleared up.

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