

1) Daniel Castello

título: Calibração de Modelos de Cabos de Linha de Transmissão

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Resumo: Este trabalho apresenta uma estratégia de calibração de modelos de cabos de linhas de transmissão de alta voltagem. Dois modelos mecânicos são considerados para as análises e a calibração é feita a partir da abordagem Bayesiana. As amostras da distribuição a posteriori são obtidas a partir do algoritmo DRAM (Delayed Rejection Adaptive Metropolis). A classificação dos modelos adota o paradigma Bayesiano levando em conta, simultaneamente, a capacidade de ajuste de dados de cada modelo assim como o seu nível de complexidade. As análises consideram dados experimentais obtidos no Centro de Pesquisas da Eletrobras (CEPEL).

Keywords: Cabos de Linha de Transmissão, Vibrações, Derivadas Fracionárias, Inferência Bayesiana, Seleção de Modelos

2) Thiago Ritto

Title: 'Uncertainties in the dynamical response and stability of rotating systems: modeling, simulation and lab experiments'

Author: Thiago G Ritto (UFRJ)

Abstract: This work is interested in the modeling and simulation of uncertainties in the response and stability of rotating systems. Two specific applications are tackled: drill string dynamics and rotor with fluid-induced vibrations due to internal seals. In the first application the system is nonlinear and uncertainties in the bit-rock interaction (local nonlinearity) are taken into account. In the second application the system is linear and uncertainties in the internal seal coefficients are taken into account. For both applications the systems are discretized by means of the finite element method and a probabilistic approach is applied to model the uncertainties. Two small test rigs were designed and constructed in the Acoustics and Vibration Lab of the Federal University of Rio de Janeiro, such that simulation and experiments results might be compared.

3) Haroldo Campos Velho

Title: "Predictability for an Atmospheric Global Circulation Model addressed by

ensemble prediction with initial condition determined with neural network"

- Authors: Rosangela S. Cintra (LABAC-INPE), Haroldo F. de Campos Velho (LABAC-INPE), Steven Cocke (COAPS-FSU)

- Abstract: Modeling the atmospheric dynamics is a permanent challenge. There are several processes which are not well represented: the Navier-Stokes numerical solution, physical process (cloud formation, precipitation, turbulence, surface covering, radiative transfer are few examples), geophysical data (topography, soil moisture, chemical components in the atmosphere), and initial condition. All of these features imply in uncertainties in the mathematical model. A scheme to evaluate the uncertainty quantification, also called "predictability", a confidence interval is calculated by a Monte Carlo integration named ensemble prediction. Another challenge is to identify the initial condition. The latter procedure is obtained by the data assimilation (DA) method. A new technique based on neural network is applied to find the initial condition. Our results were obtained with the Atmospheric Global Circulation Model (AGCM) from the Florida State University.

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4) Eduardo Souza de Cursi

Titulo: "Estatísticas para objetos em dimensão infinita: aplicação a famílias de curvas"

Autores: Eduardo Souza de Cursi, Emmanuel Pagnacco, Mohamed Bassi.

Resumo

Neste trabalho, introduzimos uma abordagem inovadora para determinar a média e um intervalo de confiança para um conjunto de objetos em um espaço métrico de dimensão infinita, por exemplo, composto de curvas e superfícies. A abordagem baseia-se na determinação do membro mais representativo da família, minimizando a distancia do espaço - por exemplo, uma distância de Hausdorff. Este método é aplicado à análise de fronteiras incertas de Pareto na otimização multiobjetivo (MOO). A determinação da frente de Pareto do MOO determinista é realizada minimizando o hipervolume contido entre a frente e o ponto da utopia. Damos alguns exemplos e aplicamos a abordagem a uma estrutura semelhante à treliça para a qual as funções objetivas conflitantes, como a massa da estrutura e o deslocamento máximo, devem ser minimizadas.

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5) Roberta Lima

Titulo: Electromechanical system with random dry-friction

Autores: Roberta Lima e Rubens Sampaio

Resumo:

This work analyzes the stochastic nonlinear dynamics of an electromechanical system with random dry-friction. The system is composed of a cart, whose motion is excited by a DC motor. The coupling between the motor and the cart is made by a mechanism called scotch yoke, so that the motor rotational motion is transformed in horizontal cart motion in a rail. It is considered the existence of random dry-friction friction between the cart and the rail. In the friction model, the friction coefficient is modeled as a stochastic field varying along the rail. Due to the random dry-friction, the resulting motion of the motor can be characterized by two qualitatively diferente and alternate modes, the stick- and slip-modes, with a non-smooth transition between them. The focus of the work is to characterize with a probabilistic approach the stochastic response of the system.

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6) Rubens Sampaio

Titulo: Some remarks about the onset of uncertainties, the quest for atoms, and the birth of stochastic differential equations.

Abstract:

In 1905 Einstein combined random walks with Maxwell-Boltzmann distributions to stablish an equation that led Perrin in 1908 to prove the existence of atoms. How the results of Einstein and Perrin were related with Newtonian mechanics was not clear. Langevin, in 1908, derived an equation showing the relation and explaining the dynamics of Brownian motions. The equation of Langevin can be considered the onset of uncertainties in Physics and the birth of stochastic differential equations. The talk discusses the history of the main events and their importance.