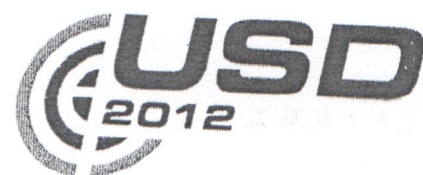


40-1



BOOK OF ABSTRACTS

17-19 September, 2012
KU Leuven, Belgium



KU LEUVEN

13:00 **Extension of the Background/biResonant decomposition to the estimation of the kurtosis coefficient of structural response (ID 582)**

V. Denoël, *University of Liège, Belgium*

Based on the observation of the existence of different timescales, this paper provides an approximate method to compute the kurtosis coefficient of the response of a linear-time-invariant system subjected to a low-frequency non Gaussian input. While the kurtosis coefficient is formally obtained by a multidimensional integration of the corresponding spectrum, the proposed method only requires the estimation of a single definite integral. The speedup performance is three to four orders of magnitude and the approximation is very accurate as it corresponds to the leading order expansion of the formal solution, with the ratio of the identified timescales considered as a small parameter.

13:00 **Effects of uncertainties on the dynamic response of a system with non-regular nonlinearities (ID 151)**

J. Didier, J.-J. Sinou, *Ecole Centrale de Lyon, France*

B. Faverjon, *INSA Lyon, France*

The effects of uncertainties on the non linear dynamics response remains misunderstood and most of the classical stochastic methods used in the linear case fail to deal with a non linear problem. So we propose to take into account of uncertainties into non linear models, by coupling a Multi-Harmonic Balance Method (MHBM) and the Polynomial Chaos Expansion (PCE). Nevertheless PCE doesn't seem adapted to deal with multiples solutions observed in non linear systems. So a new formulation of the non linear dynamic problem is proposed in which the excitation pulsation is considered as a stochastic parameter and expanded on the PCE basis. The expression of the non linear force in stochastic domain and frequency domain is obtained by using an Alternating Frequency Time method with Probabilistic Collocation (PC).

13:00 **Uncertainty quantification for worst case gust loads prediction (ID 183)**

H. Haddad Khodaparast, *University of Liverpool, United Kingdom*

J.E. Cooper, *University of Bristol, United Kingdom*

A system identification based approach is introduced to enable rapid prediction of worst case 1D and 2D gust loads. Using a simple 5 DOF flexible aircraft model, it is shown how the system identification method can be simply incorporated with a surrogate modeling approach, Kriging in this case, to determine worst case loads with a 97% reduction in computation compared to a brute force approach. The methodology is then used for preliminary studies into the prediction of the effects of stiffness and aerodynamic variations for worst case gust response, showing how variations in 2D correlated loads can vary.

13:00 **Steel lattice sightseeing tower's horizontal vibrations induced by human movement (ID 457)**

L. Gaile, I. Radinsh, *Riga Technical University, Latvia*

Researchers mostly concentrate on modelling the walking induced dynamic loading on the light-weight structures such as pedestrian bridges, grandstands or slender floor slabs. This paper analyses the slender observation towers' response to visitors' ascending or descending induced dynamic loads analytically and experimentally. This paper presents the critical range of the tower's frequencies when the dynamic assessment is necessary to assure acceptable accelerations regarding visitors comfort. This is a topical issue in locations where the seismic design is not required and wind conditions are relatively mild which results in very slender and light-weight structures.

13:00 **PDF solution of stochastic oscillators with even nonlinearity under parametric excitation on velocity (ID 77)**

S.-S. Guo, G.-K. Er, V.P. Iu, *University of Macau, Macao*

The stationary probability density function (PDF) solutions of the responses of stochastic dynamic oscilla-