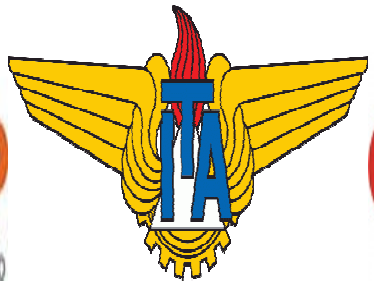

Workshop on Emergent topics in nowadays engineering science and mechanics.

Main Theme: Vibrating Systems of Limited Power Supply (NIS), with Fractional Damping.

October 19, 2015. **Auditório Otto Weinbaum (ITA)**

Organization: Prof J. M. Balthazar (ACIESP, ITA, ABCM), Prof. L. C. S. Goes (ITA,ABCM), Prof. A. Nabarrete (ITA), Dr. C. Oliveira (Post doctorate, ITA) and Prof. G.Litak (Lublin University of Technology - Poland).

Over the years, the construction of Models has played an important part in the discovery and dissemination of knowledge. The degree of realism desired from a mathematical model often depends upon many considerations. Ideally, the combination of science and modeling leads to a complete understanding of the phenomenon being studied.

The highly generic, interdisciplinary quality of the insights gained in the last few decades has spawned myriad applications in almost all branches of science and technology and even well beyond. Wherever the quantitative modeling and analysis of complex, nonlinear phenomena are required, chaos theory and its methods can play a key role. Chaos and nonlinear dynamics initially developed as a new emergent field with its foundation in engineering and applied sciences.

Analytically modeled, numerically simulated, and experimentally realized to demonstrate enhanced capabilities and new challenges. By considering that most realistic vibration environments are more accurately described as either stochastic,

multi-frequency, time varying, or some combination thereof, narrowband linear systems are fated to be highly inefficient under these conditions.

Nonlinear systems, are capable of responding over a broad frequency range; suggesting an intrinsic suitability for efficient performance in realistic vibration environments. As the memory of the dynamical system induces extra degree of freedom for the phase space the standard methods of dynamical response analysis and system identification, which relies on the knowledge of system dimensionality cannot be used.

The Topics of interest include Interdisciplinary approaches and complex nonlinear phenomena in problems encountered in emergent engineering practice. By other hand, nevertheless, despite of great advances of the vibrating theory, some kind of vibrations still meet which cannot be well explained by current vibrating theory.

This workshop aims to deal with some relevant contemporary topics on nonlinear vibrating systems, such as non-ideal excitation and fractional damping, as they apply to various **cutting-edge** branches of engineering. and sciences."

SCHEDULE

OCTOBER 19, 2015. AUDITÓRIO OTTO WEINBAUM (ITA)

7: 45
REGISTRATION
8: 00- 8:10
OPENING REMARKS PRO-RECTOR OF RESEARCH ITA AND HEAD OF MECHANICAL DIVISION

PRESIDENT: A .NABARRETE - ITA

8: 10– 9:10

KEYNOTE LECTURE PROF. G. LITAK (LUBLIN, POLAND)

REGULAR AND CHAOTIC VIBRATION IN A PIEZOELECTRIC ENERGY HARVESTER WITH FRACTIONAL DAMPING

RESEARCH WORKS

9:15-9:45

R. T. ROCHA (FEB-UNESP-BAURU).J. M. BALTHAZAR(ITA, SÃO JOSÉ DOS CAMPOS), A. M.TUSSET UFTP-PONTA GROSSA, PR), R.M. L. R. F. BRASIL (UFABC, STO ANDRÉ, SP), J. L. P. FELIX (UNIPAMPA, RS). (D. D. QUINN, UNIVERSITY OF AKRON, AKRON, OH, USA)

INVESTIGATION OF VIBRATION-BASED ENERGY HARVESTING OF A NONLINEAR PORTAL FRAME STRUCTURE

9: 45 - 10: 15

D. RADE (ITA)

CONTRIBUTIONS TO THE DEVELOPMENT OF PIEZOELECTRIC ENERGY HARVESTERS

10:15-10: 45- **COFFE BREAK -ENGINNERING MECH DIVISION**

10 45 -11: 15

D. COLON(USP-SP), S.R. F. Rosa(UNB, BRASILIA),C. A. REIS(UNESP-BAURU, SP), J M BALTHAZAR(ITA), S. KACZMARCZYK(UNIVERSITY OF NORTHAMPTON, UK)

A COMPARATIVE ANALYSIS OF INTRUSIVE AND NONINTRUSIVE POLYNOMIAL CHAOS IN STOCHASTIC NONLINEAR DYNAMICAL SYSTEMS

11:15 – 11:40

S. DAVI-(USP-PIRASSUNUNGA) . V. DE SOUSA , C. A. VALENTIM JR. , L. R. TREVISAN, L. P. MAGALHÃES, J.M. BALTHAZAR(ITA, SÃO JOSÉ DOS CAMPOS)

PERFORMANCE COMPARISON BETWEEN FRACTIONAL AND INTEGER PID CONTROLLER TO AN ACTIVE IMAGE STABILIZATION

11:40-12: 10

C.OLIVEIRA(ITA), A.NABARRETE (ITA),J.M.BALTHAZAR(ITA), L.C,S GOES(ITA),J.T.MACHADO(INSTITUTO DE ENGENHARIA DO PORTO,PORTO, PORTUGAL)

FRACTIONAL CALCULUS AND APPLICATIONS IN ENGINEERING AND SOME REMARKS ON PERIDYNAMICS

12: 10- 14: 00 SHORT **LUNCH BREAK**

PRESIDENT: D. RADE (ITA)

14:00- 15: 00

KEYNOTE LECTURE J M BALTHAZAR (ITA)

TRAVELING THROUGH NON-IDEAL VIBRATIONS AND CONTROLS

RESEARCH WORKS

15: 00- 15: 30

R. AVANÇO, H. NAVARRO(USP,SÃO CARLOS),.J.M.BALTHAZAR(ITA, SÃO JOSÉ DOS CAMPOS), R.M. L. R. F. BRASIL (UFABC, STO ANDRÉ, SP), A. M.TUSSET UFTP-PONTA GROSSA, A. B. MADUREIRA (UNESP- SOROCABA, SP)

NONIDEAL CRANK-SLIDER MECHANISM COUPLED TO THE SUPPORT OF PENDULUM

15: 30- 16: 00

E. L. REMPEL, R. CHERTOVSKIKH, E. CHIMANSKI (ITA)

ROUTE TO HYPERCHAOS IN RAYLEIGH-BÉNARD CONVECTION

16: 00- 16: 30 **BREAK**

16:30- 17:00

A. NABARRETE (ITA)
A THREE LAYER QUASI 3D FINITE ELEMENT MODEL FOR STRUCTURAL ANALYSES OF SANDWICH PLATES

17: 00- 17: 30

K. A. L.CASTÃO, L. C. S. GOES, J.M.BALTHAZAR(ITA)
ON THE "SMART" ATTENUATION OF THE FLUTTER PHENOMENON AND LIMIT CYCLE OSCILLATION IN A NONLINEAR AEROELASTIC SYSTEM.

17:30- 17: 40 **SHORT BREAK**

17: 40- 19:00 **DISCUSSIONS AND CONCLUDING REMARKS**