Technische Universität Wien
Institute for Mechanics of Materials and Structures
Karlsplatz 13/202, A-1040 Wien
www.tuwien.at/en/cee/imws

Technische Universität Wien
Center for Geometry and Computational Design
Wiedner Hauptstrasse 8-10/104, A-1040 Wien
https://gcd.tuwien.ac.at/

Ernst Melan-Lectures

In October 2016, the Institute for Mechanics of Materials and Structures (IMWS), the Department of Civil and Environmental Engineering, and the Center for Geometry and Computational Design at Vienna University of Technology have established a new Distinguished Lecture Series in the Engineering Sciences, named Ernst Melan-Lectures.

Ernst Melan (* 1890, in Brünn/Brno, † 1963, in Vienna) was a pioneer of engineering mechanics in the 1st half of the 20th century. As professor of elasticity theory, structural mechanics, and building construction at TU Wien from 1925 to 1962, he has sustainably shaped the culture of teaching and research at this university, where he has also held the positions of department head („Dekan") and president („Rektor"). Among his numerous contributions to the engineering sciences, his shake-down theorem, as of 1936, and his general treatise of elastoplasticity, as of 1938, both anticipating many ideas which were hardly discussed before the 1950s, are true landmarks in the history of theoretical and applied mechanics.

We are pleased to announce that the Fourth Ernst Melan Lecture at TU Wien

will be given

by

Professor Pol D. Spanos
Ryon Chair in Engineering
Rice University, Houston, TX, USA

Prof. Spanos will talk about

Pragmatic Methods for Nonlinear Stochastic Structural Dynamics

on

April 26th, 2024; 2:00 p.m.
Technische Universität Wien, Karlsplatz 13, 1040 Vienna
HS 13 Ernst Melan (7th Staircase, Second Floor)

Pragmatic Methods for Nonlinear Stochastic Structural Dynamics

Pol D. Spanos
Ryon Chair in Engineering
Rice University, Houston, TX, USA

Abstract:

Methods of stochastic analysis which can be used effectively for critical problems of nonlinear structural dynamics are discussed. A brief overview of relevant concepts of stochastic variables and processes is first undertaken. Next, attention is focused on the method of Monte Carlo simulation, auto-regressive-moving-average (ARMA) filtering, and the concept of surrogate (equivalent) systems, linear or nonlinear, for response determination of nonlinear systems. Several examples of application are given.

Further, a recent treatment of a chronically challenging problem is presented. It pertains to the formulation of the method of statistical linearization   for determining the response statistics of multi-degree-of-freedom dynamic systems subject to   combined periodic/stochastic excitations.

Finally, developing themes in the area of stochastic   dynamics, such as fractional- differential-order models, are outlined.

Pol D. Spanos

Professor Spanos is a a Caltech alumnus with a Ph.D degree in Applied Mechanics and with minor I in Applied Mathematics and minor II in Business Economics; and with an MS degree in Civil Engineering . Also, he holds a 5-year diploma in Mechanical Engineering and Engineering Sciences for NTU in Athens, Greece. His interests are in the area of dynamical systems with emphasis on probabilistic (risk and reliability), non-linear, and signal-processing aspects; and with applications to structural- , aerospace- , offshore- , bio-, and materials- engineering.. He has supervised the MS theses of more than 75 students and the Ph.D. theses of more than 60 students. His research findings have been disseminated in more than 400 papers in archival journals, technical conferences, and industrial reports. He is Editor-in-Chief of the International Journal of Non-Linear Mechanics, and of the Journal of Probabilistic Engineering Mechanics. He is a Distinguished/ Honorary Member of both ASCE and ASME. He is a member of the academies NAE and AAAS (USA); and a corresponding/foreign member of NA/NAE of Hellas, Europe, Canada, China, India, and Russia. He is a Registered Professional Engineer (TX), and a Licensed CE/ME Engineer (GR) His work has been supported by NSF, DOE, ONR, AFOSR, NASA and by many industrial consortia. He has received numerous awards from NSF, ASCE, ASME, IASSAR, and Rice University (teaching prize). Since 1988, he holds the LB Ryon Endowed Chair in Engineering at Rice University in Houston, Texas.