CTU in Prague, Faculty of Mechanical Engineering

Czech Society for Mechanics

Dear Colleagues, we would like to invite you to visit the lecture:

MODELING METHODS AND COMPUTER SIMULATION OF THE MACHINE DYNAMICS

presented by

Dr Józef Grzelak

Opole University of Technology

Abstract:

Presentation includes the following five subjects:
- idea of modeling and simulation of phenomena, classification of models, formulating mathematical models,
- methods of graphical modeling of differential equations with the MATLAB-SIMULINK software,
- simulation tests and stability of linear and nonlinear mechanical systems,
- dynamical characteristics of linear and nonlinear mechanical systems,
- considering influence of parameters of the mechanical system model on dynamic characteristics courses.

First of all, the idea and main aims of computer simulation will be presented. Next, the lecturer is going to classify the models of objects and present the most widely used methods of formulation of mathematical models applied for further analysis. Then, three equivalent methods of graphical modeling of differential equations with the MATLAB-SIMULINK software will be presented (the general method, the method o successive integrations and the operational method). Limitations and advantages of these methods for modeling equations and systems of equations will be discussed. Later, the effects of simulation tests using topological methods for analysis of stability of linear and nonlinear mechanical systems of one and two degrees of freedom will be presented. Next, the lecturer will discuss the spectral transmittance matrix of a linear mechanical system of many degrees of freedom and its application for dynamical characteristics obtaining. The method for determination of dynamical characteristics by numerical calculations of nonlinear mechanical systems of many degrees of freedom will be presented; the MATLAB-SIMULINK software is applied for the calculations. The lecturer is going to present some examples for better understanding of theoretical considerations. At the end, influence of parameters of some different models of the rotating shaft susceptible to courses of their dynamical characteristics will be discussed.

The lecture will be held

on **Thursday June 27, 2013 from 12:00 to 15:00**

in the congress hall of the Faculty of Mech. Engng. CTU in Prague (room No. 17),

Technická 4, Prague 6 – Dejvice.

on behalf of FME CTU and CSM committee:
Prof. M. Růžička