



Mechanical Engineering Colloquium

November 18th, 2015

Macdonald Engineering Building (MD) 267 from 11:00am-12:00pm

Prof. Michael Valášek

Czech Technical University in Prague

Mechatronics – New Source of Invention for Machines

Abstract:

The study of mechatronic product development is the subject of this seminar, which starts with the consideration of the structure of a mechatronic system and the initial mechatronic enthusiasm. Then, the usual problems of direct application of mechatronic ideas are described. The lack of some components in the structure of a mechatronic system is pointed out. The speaker stresses that the search for such a key component is the source of invention in mechanical engineering. The main message of the seminar is that mechatronics gives rise to inventions in mechanical engineering. Many examples from the speaker's practice illustrate this message. One is a sensor for road-tire force and a new tire with actuators for road-friendly and generally X-friendly vehicle suspensions. This leads to the concept of mechatronic stiffness and to advanced cable-driven robots, via redundant actuation and symmetric asymmetry for new parallel-kinematics robots and machine tools. Another example is redundant measurement to increase sensor accuracy; one more is the equidistant mechanism for direct measurement of the end-effector of robots and machine tools. In some of these examples the applied design procedure of mechatronic products, including invention-finding, is described and demonstrated.

Biography:

Michael Valášek is Professor and Dean of the Faculty of Mechanical Engineering at the Czech Technical University (CTU) in Prague. The speaker obtained his M.Eng. (1980) and Ph.D. (1984) degrees from the same university. Upon receiving his Ph.D. degree, and a stint at the Imperial College, the speaker has been affiliated with the CTU, which conferred upon him the Dr.Sc. degree in 1991. He has been a full professor of CTU since 1997 and Dean of the Faculty of Mechanical Engineering since 2014. In 2003, Valášek received the "Ceska hlava" Award. His research interests include: multibody systems and robotics; control of nonlinear mechanical systems and robots; mechatronics; machine tools; vehicle dynamics; knowledge-based support of engineering design; and design methodology.