Talk: Dynamics and Vibration Control of Flexible Systems

Speaker: Wei He

Abstract: The advantages of flexible structures such as lightweight, low energy consumption and high flexibility greatly motivate the applications of flexible structures in the fields of aviation, aerospace, robotics, offshore engineering, etc. However, usage of flexible structures will produce excessive vibrations, which make a negative effect on the system's performance, and even lead to the limited life-span of the flexible structures. Therefore, design of an effective control method for vibration suppression of flexible structures is significant in practice. In the last decades, there have been increasing interests in the modeling and control of flexible mechanical systems. Dynamic modeling and control design of the flexible systems is a challenging task in the field of control systems. For purpose of dynamic analysis, the flexible systems (the flexible string, Euler-Bernoulli beam, and Timoshenko beam) are regarded as distributed parameter systems with infinite dimensions. Dynamic model of the flexible systems is derived by use of the Hamilton's principle. Lyapunov method is used for stability analysis for the closed loop system. Simulation results are given to verify the control performance.