



Fundamentals of Vibration Theory for Discrete and Continuous Systems

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The course contains fundamentals of vibration theory for discrete and continuous systems including also wave propagation effects. This lecture is mainly dedicated to mechanical systems and structures, nevertheless, the gained knowledge can be also used for current vibrations in electrical circuits. Moreover, the primary cases of parametric, self-excited, non-linear vibrations, vibrations of rotating systems as well as fundamentals of dynamic diagnostics and vibro-isolation of technical objects will be considered.

Main topics:

1. Fundamentals of mechanical vibration theory.
2. Dynamic analysis of discrete systems.
3. Dynamic analysis of continuous and discrete-continuous (hybrid) systems.
4. Fundamentals of elastic and visco-elastic wave propagation in one - and two-dimensional media.
5. Fundamentals of parametric, self-excited, non-linear vibrations and vibrations of rotating systems.
6. From the continuous system to finite elements.
7. Introduction to dynamic diagnostics and vibro-isolation problems.

The total number of lecture hours: 30, laboratory exercises: 0 hours, self-teaching: 60, direct tutoring and consultations: 15 hours.

ECTS Points: 4