

Auskunft:

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Condition Monitoring

Abstract:

Through the lecture, the students acquire highly up-to-date knowledge about the current and future condition monitoring (CM) systems and their significance for the safety and service life of machines and structures. In addition, the students acquire practice-relevant skills and thus are independently able:

- to make a suitable selection of sensors and hardware for simple tasks in machine and structure diagnosis,
- to draw conclusions about the health and load state of the machine/structure from the vibration behavior,
- to interpret measurement data using signal analysis and feature extraction techniques (Matlab exercises),
- to program simple algorithms for automatic CM of machines and structures (Matlab exercises).

Contents:

- Introduction (Examples of Machine and Structural Health Monitoring, CM and maintenance strategies, Overview of CM principles and methods)
- Sensors and Hardware for vibration-based CM (Sensor principles, Strain measurement, Measurement of speed and angles, Acceleration measurement, Hardware chain and sources of error, Sensor positions w.r.t. ISO standards)
- Signal processing for vibration-based CM (Characteristics of vibration signals, Characteristic signals from structural parts and rotating machine components, Principles of CM for rotating machinery, Principles of Structural Health Monitoring, Statistical-based change detection, Signal features for damage identification, Machine learning for compensation of operational effects on signal features, Sensor fault detection within CM-Systems)
- Outlook: CM perspectives in a "digital world" (CM for networked machines in context of industry 4.0, Methods synthesis within CM strategies)
- Application cases for CM