

Einladung zum Vortrag

von Herrn Dr. Sajjad Edalatzadeh (TU Chemnitz) zum Thema

Non-located observer design for stabilization of micro-beams

am Montag, 23.03.2020, um 12:00 Uhr, in Raum (IM) SR 034

Abstract

Micro beams are used in Micro Electromechanical Systems (MEMS's) such as micro sensors and micro actuators or in Atomic Force Microscopes (AFMs). Recently, cutting-edge experiments have revealed that the dynamic behavior of a micro-beam deviates from the predictions of classical theories. This has led to development of the strain gradient elasticity theory. Since a micro beam is flexible, it undergoes undesired vibrations. These vibrations need to be suppressed using suitable control schemes. The often-adopted finite-dimensional schemes for control of micro-beams suffer from spillover instability.

For this reason, the functional analysis and semi-group theory is used to find a control scheme in an infinite-dimensional setting. In this talk, the observability and observer design problem of micro-beam model is discussed. Spectral theory of operator semi-groups as well as energy multiplier method are adopted. A non-located boundary measurement is found for which the micro-beam system is exactly observable. An infinite-dimensional observer is designed. The input-output stability of the system, the semigroup generation property of the observer, the admissibility of the observer, and the exponential stability of the closed-loop system will be discussed. The talk will conclude with some future research directions.