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Séminaire du LVA

A mechanical signal processing MEMS mirror

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Mechanical oscillators are a key component in many devices and systems. For example, scanning micro-Electromechanical mirrors and ultrasonic motors exploit vibrations to move a light beam or a mechanical device by means of oscillatory motions. The task of controlling these oscillations in a desired manner proves difficult unless they are tailored and optimized for the specific task. The present talk will discuss several mechanical systems. The first example exploits a special optimal topology that lends itself to producing periodic, non-sinusoidal motions, a device best described as a "Mechanical Fourier Series generator". The second example relies on traveling vibration waves to produce acoustic levitation and propulsion of flat objects, e.g. silicon wafers, without contact. Here too, the mechanical structure and its dynamical properties are optimized to reduce the required input power and make the production of traveling waves easier. In both cases, theoretical numerical and experimental results will be shown to demonstrate and explain the underlying theory its limitations and benefits.

Izhak Bucher received his B.Sc, M.Sc and PhD '1987,'1989,'1993 respectively (Mechanical Engineering, Technion, Israel). During 1993-96 he was a research associate Imperial College London and since 1996 he is the head of the Dynamics and Mechatronics Laboratory at the Technion. http://dynamics.net.technion.ac.il. Dr. Bucher's research covers rotating structures and machines, dynamics and vibration, traveling waves signal processing, acoustic levitation, energy harvesting and mechatronics.