MECHANICAL ENGINEERING SEMINAR

Monday, November 21 2022 at 14:30, D. Dan and Betty Kahn Building , Auditorium 1

Online: http://technion.zoom.us/BestSeminarEver

Global dynamics and Dynamical Integrity Assessment: A new rapid iterative method

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One of the main issues of nonlinear dynamical systems is that the existence of overlooked dynamical behaviors can rarely be excluded. This implies that properties such as the stability of a steady-state solution are only local. From an engineering perspective, this phenomenon poses a significant challenge. In fact, a stability analysis is insufficient to assess a system's robustness against external perturbation, a property named dynamical integrity, which is a requirement for operation safety. Methods to investigate the dynamical integrity of a steady-state solution exist; however, they are either computationally very expensive, have memory issues, or are overcomplicated.
During this seminar, first, examples of dynamical states, which are only locally stable, are provided. Then, an overlook of existing methods for dynamical integrity analysis is presented. Finally, a new numerical methodology for dynamical integrity assessment is discussed, and its effectiveness is evaluated through several examples.

Giuseppe Habib obtained his Ph.D. in Mechanical Engineering from Sapienza – University of Rome (Italy) and the Budapest University of Technology and Economics (Hungary), as part of a collaboration between the two institutes, in 2013. Then, he moved to the University of Liege (Belgium), where he spent three years as a postdoc researcher. Then, he returned to Budapest as part of a Marie Skłodowska-Curie Individual Fellowship. He is now an associate professor at the Dept. of Applied Mechanics at the Budapest University of Technology and Economics, where he has remained since 2016.
His main research interests include nonlinear dynamics in general, mainly focusing on global dynamics, dynamical integrity, vibration mitigation, and nonlinear dynamic vibration absorbers.

Seminars Coordinator: Assoc. Prof. Matthew Suss.