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Predicting and Constraining Aeroelastic Limit-Cycle Oscillations

The pursuit of sustainable aviation is driving the development of new aircraft designs with increasingly lightweight and slender configurations, which are prone to aeroelastic flutter—a dynamic instability leading to diverging oscillations. In the presence of nonlinearities, these diverging oscillations evolve into self-excited responses with a bounded amplitude called limit-cycle oscillations (LCOs). LCOs raise significant concerns in aerospace vehicle design because they can induce fatigue, structural damage, and failures, thus compromising vehicle performance and safety. Addressing these issues requires accurate and computationally efficient approaches for predicting aeroelastic LCOs and ensuring tolerable LCO characteristics early in the aeroelastic design process.

This presentation will cover recent advances in LCO prediction and design optimization including LCO constraints. The methods presented can enhance aerospace vehicle performance and safety while also streamlining the design process, bringing us closer to achieving sustainable aviation.

Dr. Cristina Riso

Assistant Professor
Georgia Institute of Technology

Biography

Dr. Cristina Riso is an Assistant Professor in the Daniel Guggenheim School of Aerospace Engineering at the Georgia Institute of Technology. Her group develops computational models and analysis methods to study dynamic structural and aeroelastic phenomena in the next generation of aerospace vehicles, focusing on advancing our understanding of new configurations and supporting their design. Before joining Georgia Tech, Dr. Riso was a Research Fellow in the Department of Aerospace Engineering at the University of Michigan, where she was affiliated with the Airbus-Michigan Center for Aero-Servo-Elasticity of Very Flexible Aircraft and the Active Aeroelasticity and Structures Research Laboratory. Dr. Riso earned her B.S., M.S., and Ph.D. degrees from Sapienza University of Rome. She serves on the AIAA Structural Dynamics Technical Committee and the VFS Dynamics Technical Committee and has been a major contributor to the Third Aeroelastic Prediction Workshop Large Deflection Working Group.

Friday, September 1, 2023 – 10:30 am – COB 110

Fall 2023 Seminar Series