MAE Seminar SERIES

Thursday, March 17

3:30 pM

Zoom Information

Meeting ID:

976 2525 0508

Password: MAE503

Dr. Massimiliano Vasile

Professor
Mechanical and Aerospace Engineering
University of Strathclyde

Uncertainty Quantification and Optimisation in Computational Astrodynamics

ABSTRACT

The seminar will start with a gentle introduction to the concept of uncertainty quantification and some of the existing computational techniques to model and quantify uncertainty. A presentation of the typical sources of uncertainty in astrodynamics will follow. The seminar will focus, in particular, on orbital mechanics covering both trajectories around the Earth and in deep-space. Since uncertainty quantification plays a critical role in the planning of orbital manoeuvre and the optimal design of trajectories, the seminar will provide the audience with some basic elements of optimisation and optimal control before explaining how uncertainty quantification can be coupled with optimisation to yield robust and reliable solutions.

BIO SKETCH

Massimiliano Vasile, is currently Professor of Space Systems Engineering and Director of the Aerospace Centre of Excellence at the University of Strathclyde. He received his M.S. in 1996 and Ph.D. in 2001 from Politecnico di Milano. He sits on the IAF Astrodynamics and Space Power committees, the IEEE committee on Emerging Technologies in Computational Intelligence, and the UN Space Mission Planning Advisory Group. His research interests include Astrodynamics, Space Systems, Computational Intelligence and Optimisation Under Uncertainty exploring the limits of computer science at solving highly complex problems in science and engineering. Asteroid 2002 PX33 “Maxvasile” was named in his honour in recognition of Prof Vasile’s contributions to the development of innovative techniques for the design and optimisation of space trajectories and his work on asteroid manipulation. Prof. Vasile has developed novel numerical methods for single and multi-objective optimal control problems, has pioneered the use of evolutionary computation for the global optimisation of space trajectories, and the use of imprecise probability theories in the optimisation of space systems. His research has been funded by the European Space Agency, the UK Space Agency, CNES, the Engineering and Physical Sciences Research Council, the Planetary Society and the European Commission.He coordinated the Stardust research network on asteroids and space debris, one of the success stories of the EU FP7, and the UTOPIAE network on uncertainty treatment and optimisation in aerospace engineering and he is now the coordinator of Stardust Reloaded, that is exploring advanced solutions for space sustainability, space environment management and asteroid exploration.

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