Einladung

Würzburger Mathematisches Kolloquium

Julius-Maximilians-Universität Würzburg • Institut für Mathematik

Erik I. Verriest

Georgia Institute of Technology, USA,
in diesem Semester Giovanni-Prodi-Gastprofessor

Dynamics with Implicit State-Dependent Delay and Post-Newtonian Gravitational Models

Dienstag, 26. Juli 2022 • 14:15 Uhr

Seminarraum SE40 • Mathematik Ost (Emil-Fischer-Straße 40, 97074 Würzburg)

Der Vortrag wird auch Zoom-Meeting übertragen: go.uniwue.de/ifmcolloquium-zoom

Abstract. In this colloquium, I will first discuss some problems regarding causality in systems with varying delays. These problems relate to the well-posedness (existence and uniqueness) and causality of the mathematical models for physical phenomena and illustrate why one might consider the physics first and then the mathematics.
In the second part, I consider the post-Newtonian gravitational problem as a problem with state-dependent delay. Einstein's field equations relate space-time geometry to matter and energy distribution. These tensorial equations are so unwieldy that solutions are only known in some very specific cases. A semi-relativistic approximation is desirable: One where space-time may still be considered as flat, but where Newton's equations (where gravity acts instantaneously) are replaced by a post-Newtonian theory, involving the propagation of gravity at the speed of light. As this retardation depends on the geometry of the point masses, a dynamical system with state-dependent delay results, where delay and state are implicitly related. We investigate several problems with the Lagrange-Bürman inversion technique and perturbation expansions. Interesting phenomena (gravitational entrainment, dynamic friction, fission, and orbital speeds) not explainable by the Newtonian theory emerge.

https://www.mathematik.uni-wuerzburg.de/de/aktuelles/kolloquium

Alle sind herzlich eingeladen.

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