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SEMINAR OF NUMERICAL ANALYSIS

➤ **MONDAY 8 JUNE 2015 - ROOM MA A3 30 - 14h15**

Prof. Sorin MITRAN, (Universtity of North Carolina at Chapel Hill, USA) will present a seminar entitled:

"Information theoretic model reduction for stochastic systems"

Abstract:

Advances in model reduction that have greatly facilitated engineering design are typically based on core concepts from numerical linear algebra with construction of reduced spaces from proper orthogonal decompositions and projection in Euclidean spaces playing a central role. The main theoretical underpinning of the approach is the singular value decomposition ordering of linear subspaces induced by the energy (L2) norm. This approach is intrinsically related to stochastic model reduction based on truncation of Karhunen-Loève expansions. It has been recognized that inherent nonlinearity of a system reduces the efficacy of the model reduction procedure. This talk presents a novel approach to model reduction meant to capture nonlinear behavior. The system of interest is chacterized by probability distributions organized as a Riemannian manifold. The manifold is reconstructed from linear tangent spaces obtained through principal mode analysis. The linear space projection operation is replaced by geodesic transport along the manifold, whose curvature captures the system's nonlinear behavior. The utility of the procedure is shown on two practical applications: nonequilibrated flow through porous media and construction of cytoskeleton motlity models.

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