Πανεπιστημιο Κρητης

Τμημα Μαθηματικων και Εφαρμοσμενων Μαθηματικων

Ομιλιες Στατιστικης και Πιθανοτητων

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Information-theoretic Uncertainty and Sensitivity Bounds for Stochastic Dynamics and Rare Events

Uncertainty quantification is a primary challenge for reliable modeling and simulation of complex stochastic dynamical systems. Due to their dynamic nature, we need to assess the impact of these uncertainties on the transient and long-time behavior of the stochastic models and derive uncertainty bounds for observables of interest. We present uncertainty and sensitivity bounds for path-space observables of stochastic dynamics in terms of a novel goal-oriented divergence which incorporates both observables and information theory objects such as the relative entropy rate. In the case of sensitivity analysis, the derived sensitivity bounds rely on the path Fisher Information Matrix. Substituting relative entropy with Renyi entropy, uncertainty and sensitivity bounds for rare events are derived.