IFAC MIM '2013

Invited Session

CONTROL OF COMPLEX SYSTEMS UNDER EXTREMAL RANDOM RISKS

Session Chair and Organizer

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Description of the session

Loss of lives and economic damage, loss of energy and information by extreme events in climate, or energetic and telecommunication systems by hazards of extreme nature have been recurrent in human history. Although the mean behavior of stochastic processes is well understood in many fields of application, the statistical modeling and control of extreme events arising in complex systems in time and space remain a difficult mathematical challenge. This is mainly caused by the rarity of extreme events, their non-Gaussian amplitudes, the involved different spatio-temporal scales, a slower decay to zero of heavy tails than that of an exponential rate and the lack of some or all moments of the underlying distributions. The analysis of heavy-tailed distributions and, hence, of risks owing to extremal events requires special methods of estimation due to the specific features of the underlying stochastic problems.

Topics:

Topics of the session focus on control methods for stochastic processes in the presence of heavy-tailed noise. The latter are arising in different fields including environmental statistics and natural catastrophe claims, telecommunication systems and Internet, finance and insurance, as well as others relevant industrial sectors.

It is the aim of the session to exchange ideas and latest advances among researchers from all around the world with regard to efficient methods regarding the control of stochastic processes with heavy-tailed noise.

The topics include but are not restricted to:

- Signal processing under extremal risks;

- Control, modeling and analysis of extremes in time series;

- Prediction of records

and their applications.

Keywords: Control, complex system, extremal random risk

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