

Structural Analysis of Spatio-Temporal Threshold Exceedances

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Abstract: Due both to the complexity of real systems, and to the technical difficulties inherent to extremal analysis, the statistics of extremes in spatio-temporal processes has become one of the most challenging research areas in relation to the increasingly demanding interest on risk assessment tools in many fields of application. Recent advances in spatio-temporal statistical analysis are focused, in particular, on the formulation and study of new model families, flexible to represent such real complexities and, at the same time, suitable for technical treatment and interpretation, as well as on related system dynamics problems. In this paper, significant characteristics of threshold exceedances with reference to structural properties of the processes generating such events, particularly in the context of input/output systems and in relation to some specific transformations of practical interest, are explored. Some related approaches and problems, involving geometrical, probabilistic and statistical aspects, are reviewed and discussed.

Keywords: entropy; extremes; input/output systems; spatio-temporal processes; threshold exceedances.