INDAM MEETING:

HYPERBOLIC DYNAMICAL SYSTEMS IN THE SCIENCES

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How logarithm laws may fail in a mixing system: an example with a reparametrization of a translation on the torus

Logarithm laws are ubiquitous in the ergodic theory of dynamical systems. Our attention will be focused on logarithm laws for the hitting time. In this context a tight relation can be established between logarithm law behavior and rate of decay of correlations. We will show an example of a translation on the torus for which the logarithm law, in a sense, fails. The construction of this example, highly non-generic, is based on specific properties of the translation vector which are best understood in terms of continued-fraction expansions. A suitable time-reparametrization of the suspension flow on the 3-torus allows us to obtain a mixing system which retains the same kind of pathological hitting-time behavior.
(Joint work with S. Galatolo)