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Abstract

In this short survey review we discuss foundational issues of the probabilistic approach to information theory and statistical mechanics from a unified standpoint. Emphasis is on the inter-relations between theories. The basic aim is tutorial, i.e. to carry out a basic introduction to the analysis and applications of probabilistic concepts to the description of various aspects of complexity and stochasticity. We consider probability as a foundational concept in statistical mechanics and review selected advances in the theoretical understanding of interrelation of the probability, information and statistical description with regard to basic notions of statistical mechanics of complex systems. It includes also a synthesis of past and present researches and a survey of methodology. The purpose of this terse overview is to discuss and partially describe those probabilistic methods and approaches that are used in

statistical mechanics with the purpose of making these ideas easier to understanding and to apply.

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