

Markov jump processes modelling some basic biological phenomena

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The general approach that models a class of complex biological phenomena at the micro-scale level of interacting entities of the system in terms of a Markov jump process and related linear evolution equations is discussed. Its relationship with the intermediate models referring to the meso-scale level of description of test-entities and given in terms of bilinear Boltzmann-type equations is defined. Mathematical relationships between these descriptions are presented and explicit error estimates are given. The general framework is applied to propose a new mesoscopic model of DNA denaturation.