

Computing the Statistics of Deterministic Systems

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We consider some simple deterministic systems of interacting particles. We determine statistical properties of these systems and examine whether these properties are reproduced under numerical discretization. In particular, we are interested in the limit as the steplength goes to zero while the stiffness of the interaction potential goes to infinity. We compare the results from a symplectic scheme and from an energy-conserving step-and-project method. The former method gives remarkably good convergence, whereas the latter converges to the wrong limit. An analysis of the performance of the algorithms is given.