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Coupling methods for efficient simulation of spatial population dynamics

Ilmari Karonen

(Submitted on 13 Apr 2012)

Coupling is a widely used technique in the theoretical study of interacting stochastic processes. In this paper I present an example demonstrating its usefulness also in the efficient computer simulation of such processes. I first describe a basic coupling technique, applicable to all kinds of processes, which allows trading memory use for a limited speedup. Next, I describe a specialized variant of it, which can be used to speed up the simulation certain kinds of processes satisfying a monotonicity criterion. This special algorithm increases the speed by several orders of magnitude with only a modest increase in memory usage.

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