

Baake, Michael; Baake, Ellen**An exactly solved model for mutation, recombination and selection.** (English) Zbl 1056.92040
Can. J. Math. 55, No. 1, 3-41 (2003); erratum ibid. 60, No. 2, 264-265 (2008).

Summary: It is well known that rather general mutation-recombination models can be solved algorithmically (though not in closed form) by means of Haldane linearization. The price to be paid is that one has to work with a multiple tensor product of the state space one started from.

Here, we present a relevant subclass of such models, in continuous time, with independent mutation events at the sites, and crossover events between them. It admits a closed solution of the corresponding differential equation on the basis of the original state space, and also closed expressions for the linkage disequilibria, derived by means of Möbius inversion. As an extra benefit, the approach can be extended to a model with selection of additive type across sites. We also derive a necessary and sufficient criterion for the mean fitness to be a Lyapunov function and determine the asymptotic behaviour of the solutions.

MSC:

92D15 Problems related to evolution
37N25 Dynamical systems in biology
60J99 Markov processes
92D10 Genetics and epigenetics
34L30 Nonlinear ordinary differential operators
06A07 Combinatorics of partially ordered sets
37H99 Random dynamical systems

Cited in **2** Reviews
Cited in **14** Documents**Keywords:**

nonlinear ODEs; measure-valued dynamical systems; Möbius inversion

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