Copula based Markov Chains with application on coalescent model

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Abstract: In this paper, we study the copula based Markov processes for both discrete time and continuous time cases. This method provides a natural and consistent way of describing dependence relationship between two stochastic processes. Conditions of the evolution of copulas for two Markov processes are specified such that the joint process is still a Markov process. As an application, we applied the copula based continuous time Markov processes to the coalescent in two colonies with correlated migration.