

ON THE NUMERICAL APPROXIMATION OF ONE-DIMENSIONAL CONTINUOUS MARKOV  
PROCESSES

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We propose a new approach for approximating one-dimensional continuous Markov processes in law. Special cases include stochastic differential equations with irregular coefficients and processes with sticky features. In particular, we prove a functional limit theorem (FLT) for weak approximation of the paths of arbitrary continuous Markov processes. Based on this result we propose a new scheme, called EMCEL, which satisfies the assumption of the FLT and thus allows to approximate every one-dimensional continuous Markov process. We determine its convergence speed in terms of Wasserstein distances. Further we present various properties of the EMCEL scheme, analyze its differences from the Euler scheme and discuss several examples.

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