Stochastic Models ›

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Sticky reflecting Ornstein-Uhlenbeck diffusions and the Vasicek interest rate model with the sticky zero lower bound

Yutian Nie & Vadim Linetsky

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Abstract

This article studies Ornstein-Uhlenbeck (OU) diffusions with sticky reflection at zero. Sticky reflecting OU diffusions are defined as weak solutions of a system of SDEs involving the local time at the boundary at zero. The transition semigroup and the distribution of the first hitting time up are characterized analytically via their spectral representations. The results are applied to the Vasicek interest rate model with the sticky zero lower bound, where the interest rate follows a sticky reflecting behavior at zero, with the stickiness parameter explicitly controlling how fast the interest rate leaves the zero lower bound.

Keywords:

Sticky reflecting diffusion | Ornstein-Uhlenbeck process | interest rate models | zero lower bound

Additional information

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