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Markovian models of short rates

In the theory of the bond market an important role play Markov processes R modelling the evolution of the short rate. They are nonnegative with the transition semigroup mapping the set of exponential functions $e^{-\lambda x-a},\ \lambda,\gamma \geq 0$, into itslf. If, in addition, the process R has continuous trajectories, then it is a solution of the stochastic equation

$$dR(t) = (aR(t) + b)dt + \sqrt{R(t)}dW(t),\ \ R(0) \geq 0.$$

In the equtiona, W is a Wiener process and a, b are constants, $b \geq 0$.

In the talk, based on a joint research with M. Barski, we describe known as well as some new results on the general case when the process R can have discontinuous trajectories. We will start from the discrete time situation.

References

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