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Feynman-Kac formula for the stochastic Bessel operator.

We introduce a stochastic process and functional that should describe the semigroup generated by the stochastic Bessel operator. Recently Gorin and Shkolnikov showed that the largest eigenvalues for certain random matrix ensembles with soft edge behavior can be understood by analyzing large powers of tridiagonal matrices, which converge to operators in the stochastic Airy semigroup. In this article we make some progress towards realizing Gorin and Shkolnikov's program at the random matrix hard edge. We analyze large powers of a suitable tridiagonal matrix model (a slight modification of the β-Laguerre ensemble). For finite n we represent the matrix powers using a Feynman-Kac type formula, which identifies a sequence of stochastic processes X_n and functionals Φ_n. We show that $\Phi_n(X_n)$ converges in probability to the limiting functional $\Phi(X)$ for our proposed stochastic Bessel semigroup. We also discuss how the semigroup method may be used to understand transitions from a hard edge to a soft edge in the β-Laguerre models. (Received February 13, 2018)