

1052-60-48

Paul M Feehan* (feehan@rci.rutgers.edu), Department of Mathematics, Rutgers University, 110 Frelinghuysen Road, Piscataway, NJ 08854-8019. *Heston stochastic volatility model and degenerate parabolic partial differential equations.*

The partial differential equations associated to the Heston or CIR stochastic processes are well-known to be degenerate parabolic. We explain how these partial differential equations are related to the linearization of the porous medium equation in mathematical physics and present explicit solutions in terms of confluent hypergeometric functions. We use these explicit solutions to show how the choice of Sobolev space for the solution impacts uniqueness and explain how the Feller parameter value determines whether boundary conditions along the degeneracy locus are required for uniqueness of the solution to European-style option pricing problems. Examination of the existence, uniqueness, and regularity questions for the analogous American-style option pricing problems is ongoing joint work with Panagiota Daskalopoulos (Columbia University). (Received August 10, 2009)