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Approximating stochastic volatility by recombinant trees

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A general method to construct recombinant tree approximations for stochastic volatility models is developed and applied to the Heston model for stock price dynamics. In this application, the resulting approximation is a four tuple Markov process. The ?first two components are related to the stock and volatility processes and take values in a two dimensional Binomial tree. The other two components of the Markov process are the increments of random walks with simple values in {-1; +1}. The resulting effi?cient option pricing equations are numerically implemented for general American and European options including the standard put and calls, barrier, lookback and Asian type pay-o?ffs. The weak and extended weak convergence are also proved.

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