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mc_hybridtree_bates

The evolution process of the Heston model, for the stochastic volatility, and Merton model, for the jumps, is:

$$\begin{cases} \frac{dS_t}{S_t} & = & (r-d)dt + \sqrt{V_t}dW_t^1 + (e^J - 1)dN_t \\ dV_t & = & \kappa(\theta - V_t)dt + \sigma_v\sqrt{V_t}dW_t^2 \\ S(t=0) & = & S_0 \\ V(t=0) & = & V_0 \end{cases}$$

where $d < W^1, W^2 >_t = \rho dt$ and $J \sim N(m, v)$. The EDP associated with the option pricing problem is solved with a finite difference scheme. Details abouts this routine in the Bates models are in there.

References