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## fd\_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](#).