

Simulating geometric Brownian motion with a cash dividend

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$$S_T \sim (S_0 - D_t e^{-rt}) \exp\left(\left[Y - \frac{1}{2}\sigma^2\right]T + \sigma\sqrt{T}N_{0,1}\right)$$

Simulating geometric Brownian motion with a cash dividend before T.

Symbol list:

S_0	Initial value at t=0 of geometric Brownian
S_T	Value of geometric Brownian motion at time T
Y	Yield of the underlying, for stocks Y=r (interest rate), futures Y=0, currencies Y=(domestic interest rate-foreign interest rate)
r	Continuous compounded interest rate
σ	Volatility
D_t	Cash dividend amount at time t
$N_{0,1}$	Random sample from a normal (Gaussian) ditribution with mean 0 and standard deviation 1.