Monte Carlo Simulation

Stochastic discrete difference equation

$$S_T = S_{T-\Delta T}(1 + \hat{\mu} + \hat{\delta}\varepsilon)$$

Stochastic continuous difference equation solved by Itô-integration

$$\frac{dS}{S} = \mu dt + \sigma\sqrt{dt}\epsilon$$

$$S(t) = S(0)e^{\left(\mu - \frac{\sigma^2}{2}\right)t + \sigma\varepsilon\sqrt{t}}$$

ε Standard normal distributed numbers

$\hat{\mu}, \hat{\sigma}$ Sample mean and sample standard deviation

$$\mu = 250\hat{\mu}\,, \sigma = \sqrt{250}\hat{\sigma},\ \ \Delta T\ = \frac{365}{250}t$$