Brief Notes #8

Relationships between Mean and Variance of Normal and Lognormal Distributions

If $X \sim N(m_X, \sigma_X^2)$, then $Y = e^X \sim LN(m_Y, \sigma_Y^2)$ with mean value and variance given by:

$$\begin{cases} m_Y = e^{m_X + \frac{1}{2}\sigma_X^2} \\ \sigma_Y^2 = e^{2m_X + \sigma_X^2}(e^{\sigma_X^2} - 1) \end{cases}$$

Conversely, m_X and σ_X^2 are found from m_Y and σ_Y^2 as follows:

$$\begin{cases} m_X = 2\ln(m_Y) - \frac{1}{2}\ln(\sigma_Y^2 + m_Y^2) \\ \sigma_X^2 = -2\ln(m_Y) + \ln(\sigma_Y^2 + m_Y^2) \end{cases}$$