# Formulae used for the OPTION CALCULATOR APP

## (1) BLACK-SCHOLES - European Options PLAIN VANILLA with continuous dividends

**Call Option Price :**

$$C(0) = S(0)\,e^{-qT} \cdot N(d_1) - K e^{-rT} \cdot N(d_2)$$

$$d_1 = \frac{\ln\left(S(0)/K\right) + \left(r - q + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

**Put Option Price :**

$$P(0) = K e^{-rT} N(-d_2) - S(0)\,e^{-qT} N(-d_1)$$

$$d_1 = \frac{\ln\left(S(0)/K\right) + \left(r - q + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$