## Black and Cox (1976)

Using the properties of Brownian motion, it can be shown that the default probability from time $t$ to time $T$ is

$$P\left[\tau \leq T \mid \tau > t\right] = N\left(h_1\right) + \exp\left\{2\left(r - \frac{\sigma_V^2}{2}\right)\ln\left(\frac{K}{V_0}\right)\frac{1}{\sigma_V^2}\right\} N\left(h_2\right)$$

where

$$h_1 = \frac{\ln\left(\frac{K}{e^{rT}V_0}\right) + \frac{\sigma_V^2}{2}T}{\sigma_V\sqrt{T}}$$

$$h_2 = h_1 - \sigma_V\sqrt{T}$$