LaTeX in VScode

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You can write and compile LaTeX in VScode.

Geometric Brownian motion is the following SDE:

$$\mathrm{d}X_t = \mu X_t \,\mathrm{d}t + \sigma X_t \,\mathrm{d}B_t, \quad X_0 := x_0,$$

which has unique solution

$$X_t = x_0 \exp\left(\left(\mu - \frac{1}{2}\sigma^2\right) t + \sigma B_t\right).$$

Since $\exp\left(\sigma B_t - \frac{1}{2}\sigma^2 t\right)$ is a martingale, $\mathbb{E}\left[X_t\right] = \mathbb{E}\left[x_0\right] \exp(\mu t)$.