

QF620 Stochastic Modelling in Finance
Assignment 4/4
Due Date: 6-Nov-2024

1. A contract pays (on maturity date T)

$$V_T = \sqrt{S_T}.$$

Derive a valuation formula for the contract at time 0 using

- (a) Black-Scholes model

$$dS_t = rS_t dt + \sigma S_t dW_t^*.$$

- (b) Static replication approach.

$$\int_0^F h(K) \frac{\partial^2 P(K)}{\partial K^2} dK + \int_F^\infty h(K) \frac{\partial^2 C(K)}{\partial K^2} dK$$