

1. Consider the Vasicek model

$$dr = \beta(\mu - r)dt + \sigma dW^Q.$$

For the three parameter sets  $[\beta, \mu, \sigma, r(0)]$  given by  $[5.9, 0.2, 0.3, 0.1]$ ,  $[3.9, 0.1, 0.3, 0.2]$  and  $[0.1, 0.4, 0.11, 0.1]$ , plot the term structure up to 10 time units (*i.e.*, plot yield versus time). Now for each of the three parameter sets, plot yield curves versus maturity up to 500 time units for ten different values of  $r(0)$ .

2. Consider the CIR model

$$dr = \beta(\mu - r)dt + \sigma\sqrt{r}dW^Q.$$

For the three parameter sets  $[\beta, \mu, \sigma, r(0)]$  given by  $[0.02, 0.7, 0.02, 0.1]$ ,  $[0.7, 0.1, 0.3, 0.2]$  and  $[0.06, 0.09, 0.5, 0.02]$ , plot the term structure up to 10 time units (*i.e.*, plot yield versus time). For the parameter set  $[\beta, \mu, \sigma]$  given by  $[0.02, 0.7, 0.02]$  and with  $r(0) = 0.1 : 0.1 : 1$ , plot yield curves versus maturity for 600 time units.

Put down your observations in the report.

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**Submission Deadline: 12th April 2025, 11:59 PM**