Financial Engineering Laboratory (MA 374)

Lab 11

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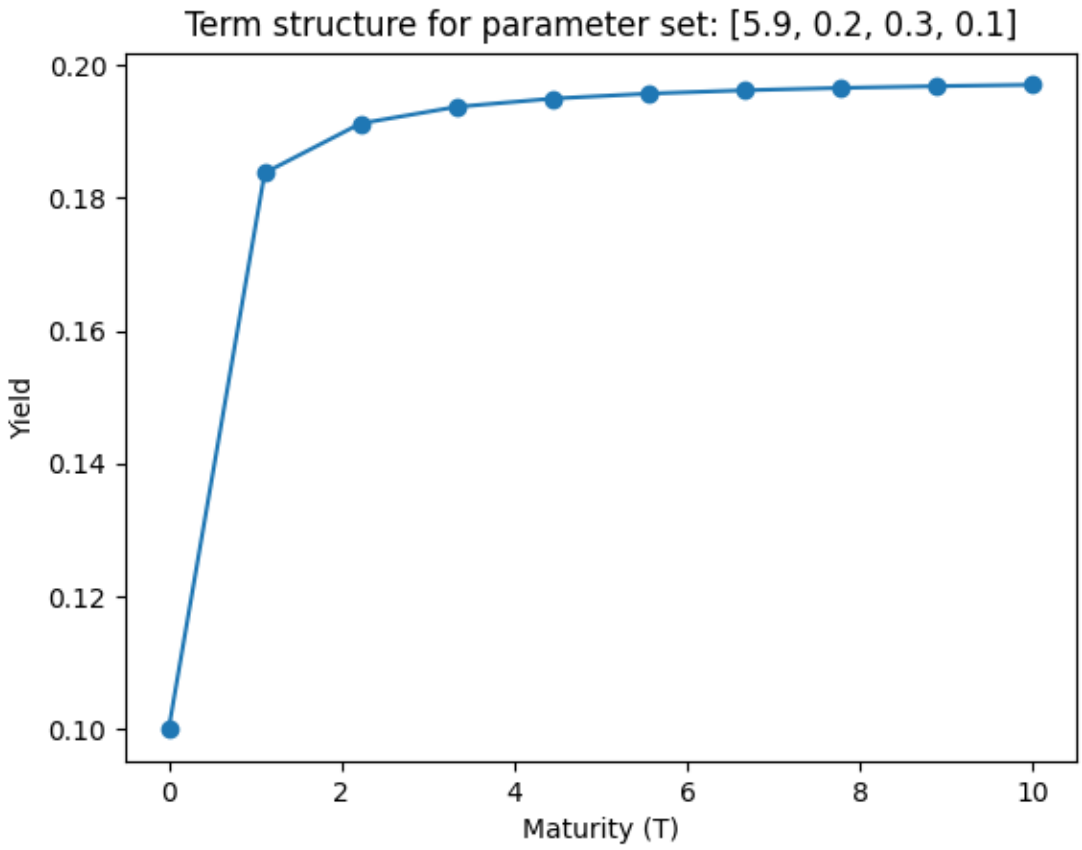
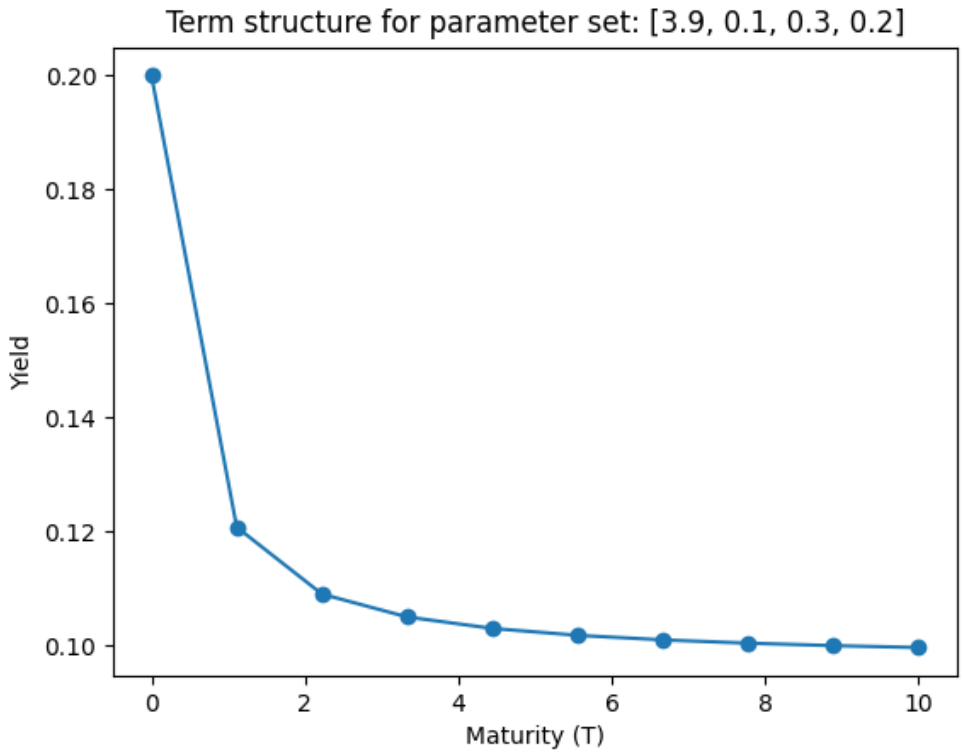
Q1: Vasicek Model

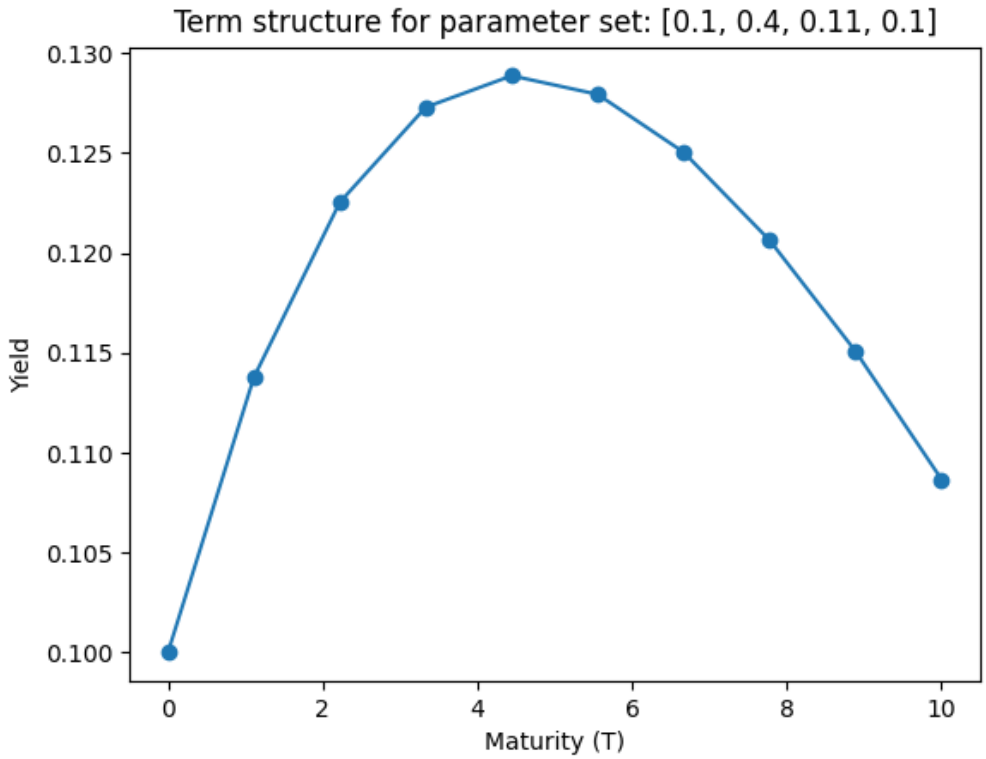
a) [5.9, 0.2, 0.3, 0.1]



b) [3.9, 0.1, 0.3, 0.2]

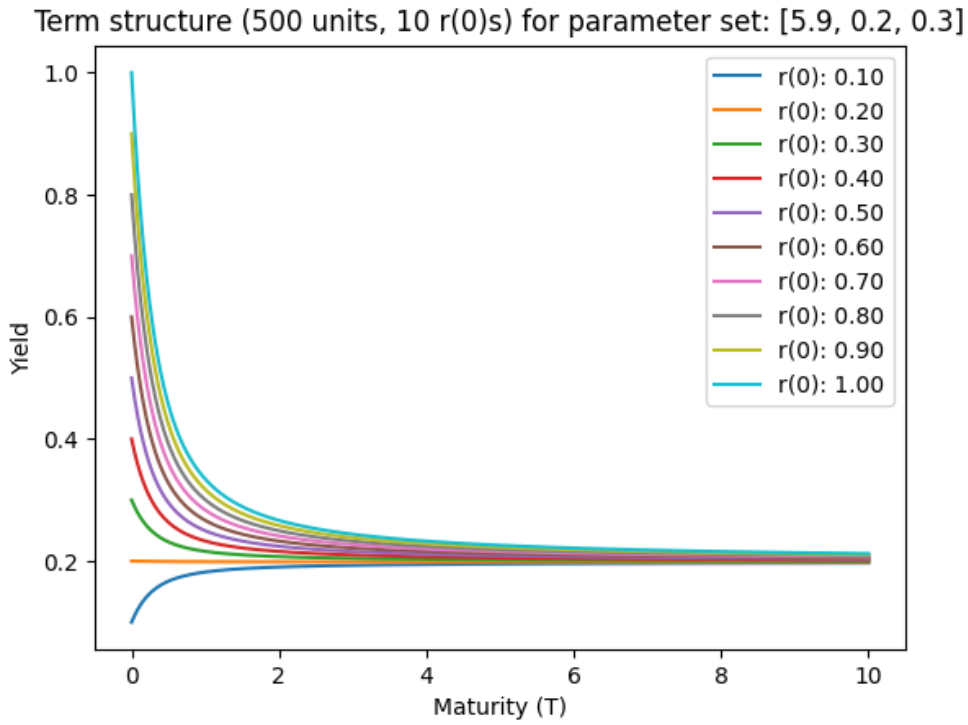


c) [0.1, 0.4, 0.11, 0.1]

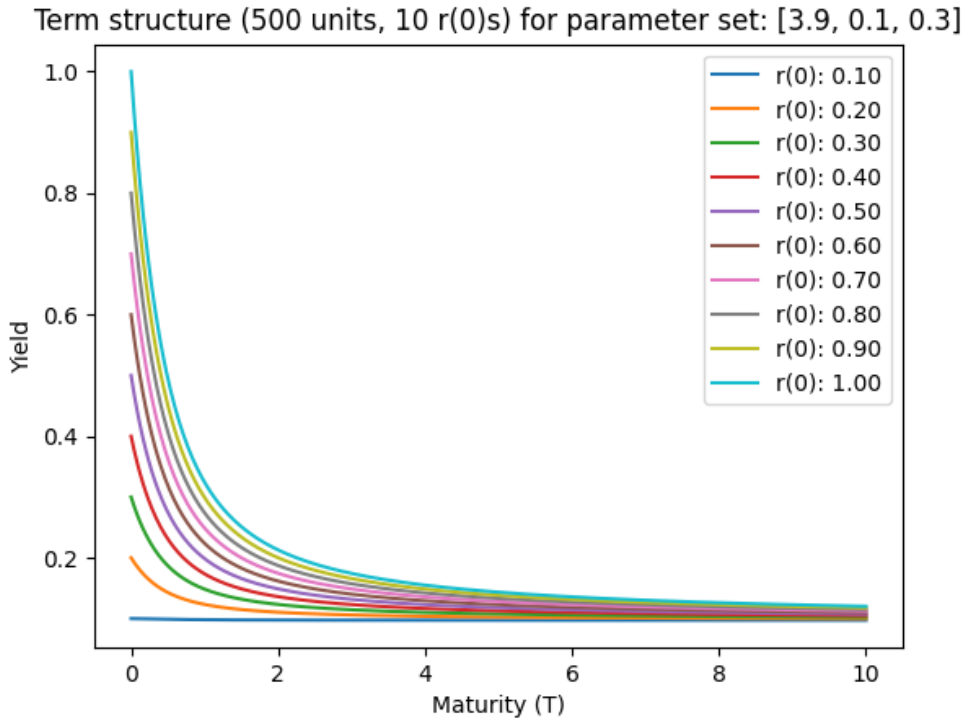


Yield curves for maturity upto 500 time units for different interest rates.

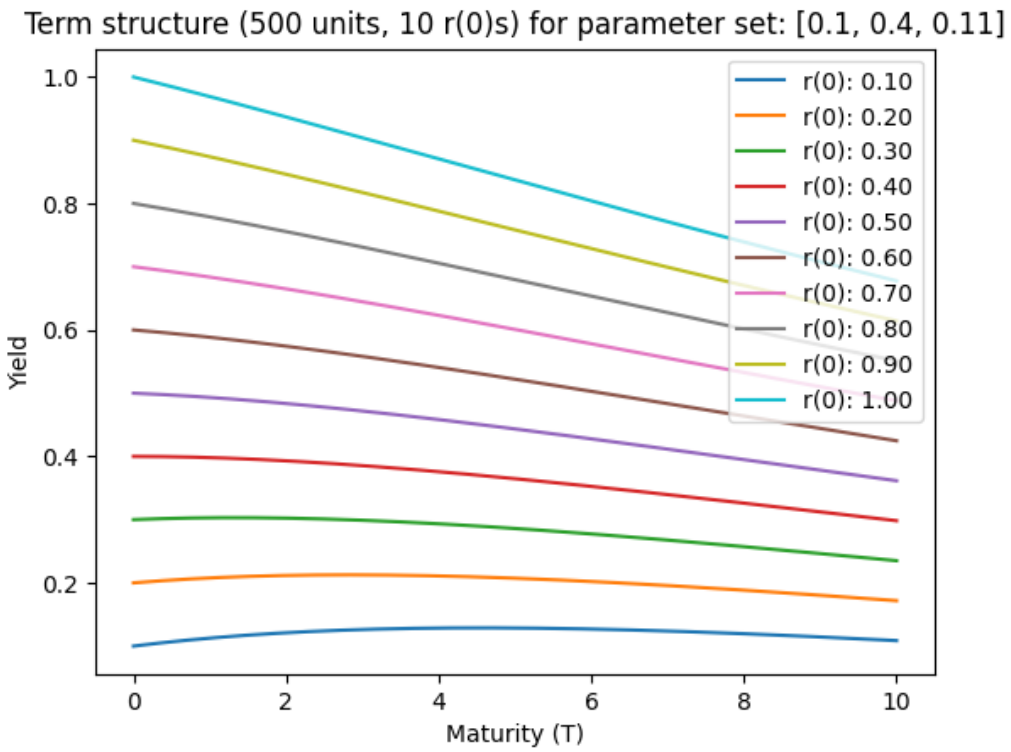
a) [5.9, 0.2, 0.3, 0.1]



b) [3.9, 0.1, 0.3, 0.2]



c) [0.1, 0.4, 0.11, 0.1]



Observations:

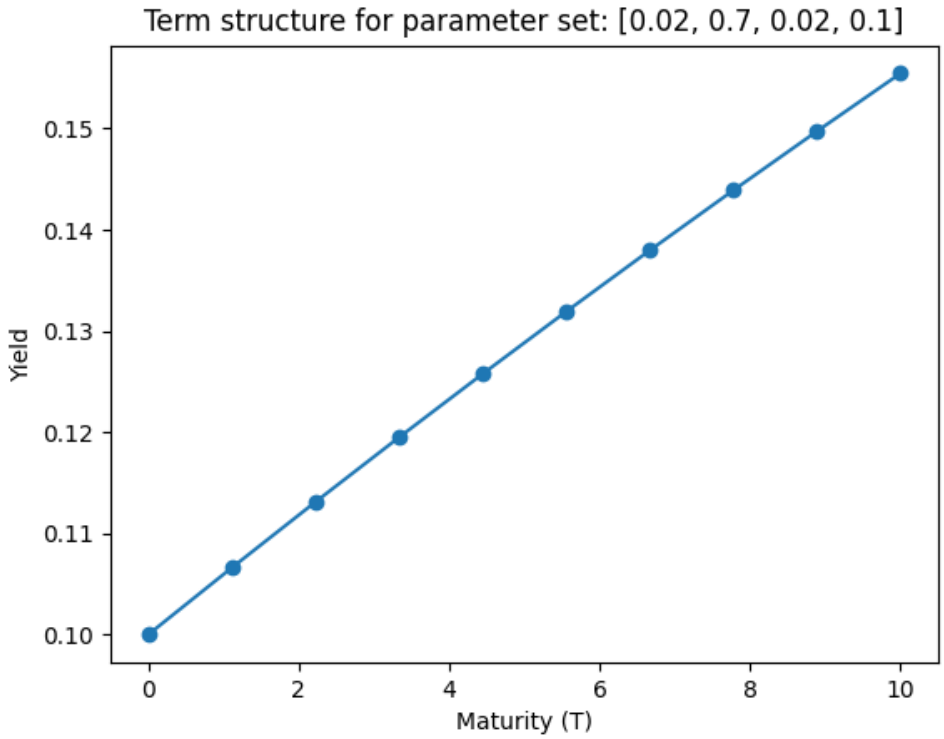
- Regardless of the starting interest rate, bond yields eventually settle at a specific value as the maturity period gets very long.

- The behaviour of interest rates over short periods (like 10 units) can vary significantly. In the first case, it rises rapidly and then converges. In the second case, it decreases rapidly and then converges. In the third case, it first rises and the converges at a lower value, thus creating a hump.

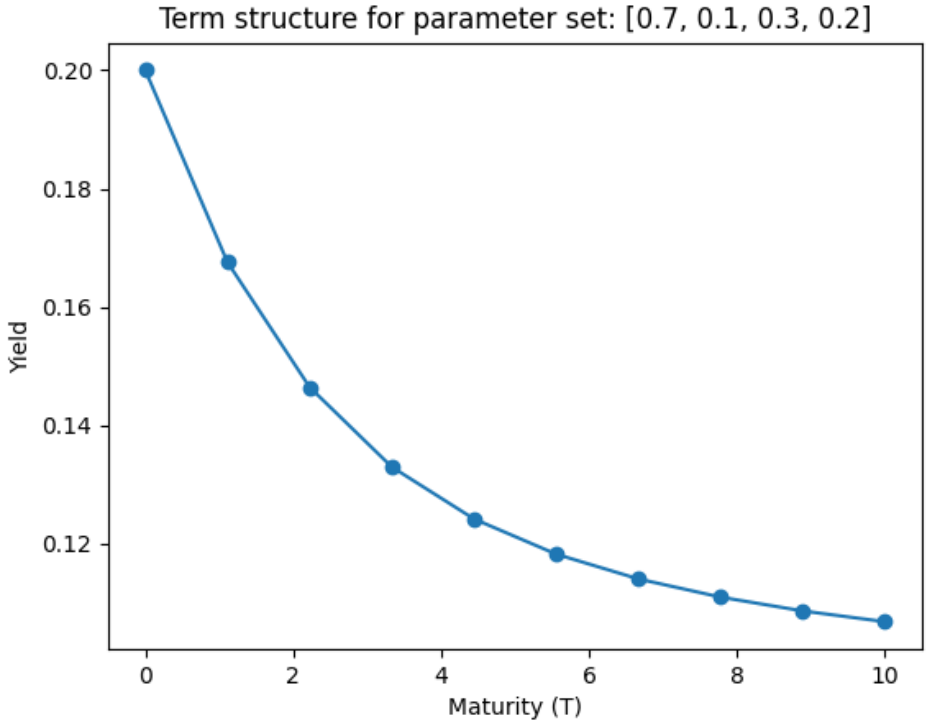
- The Vasicek model captures the tendency for interest rates to return to a central level (mean reversion). High starting rates tend to decrease over time, and low rates tend to increase, both approaching a common value.

Q2: CIR model.

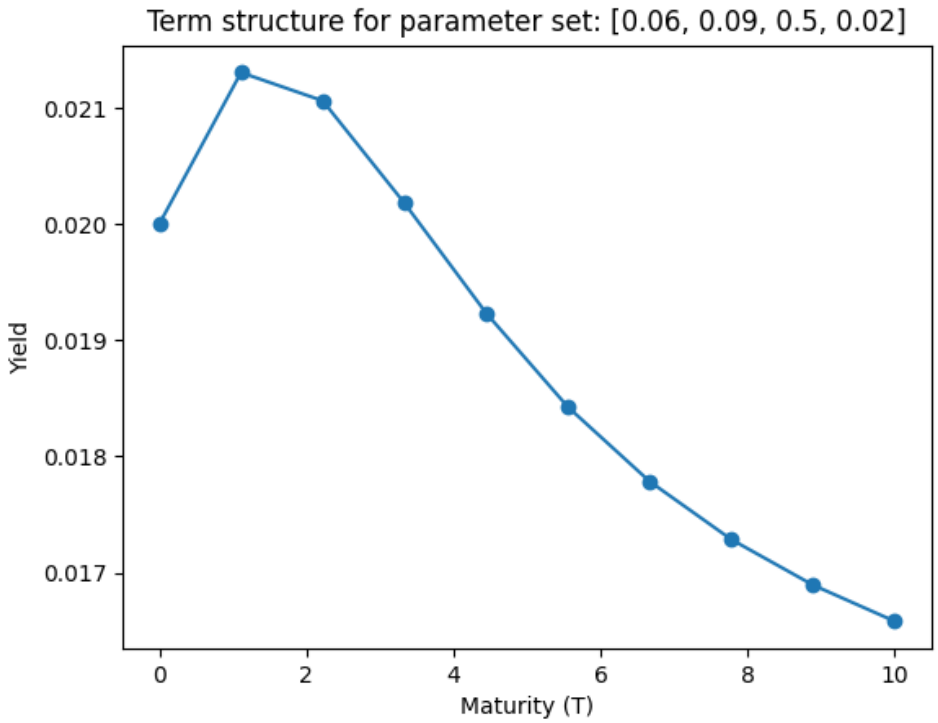
a) [0.02, 0.7, 0.02, 0.1]



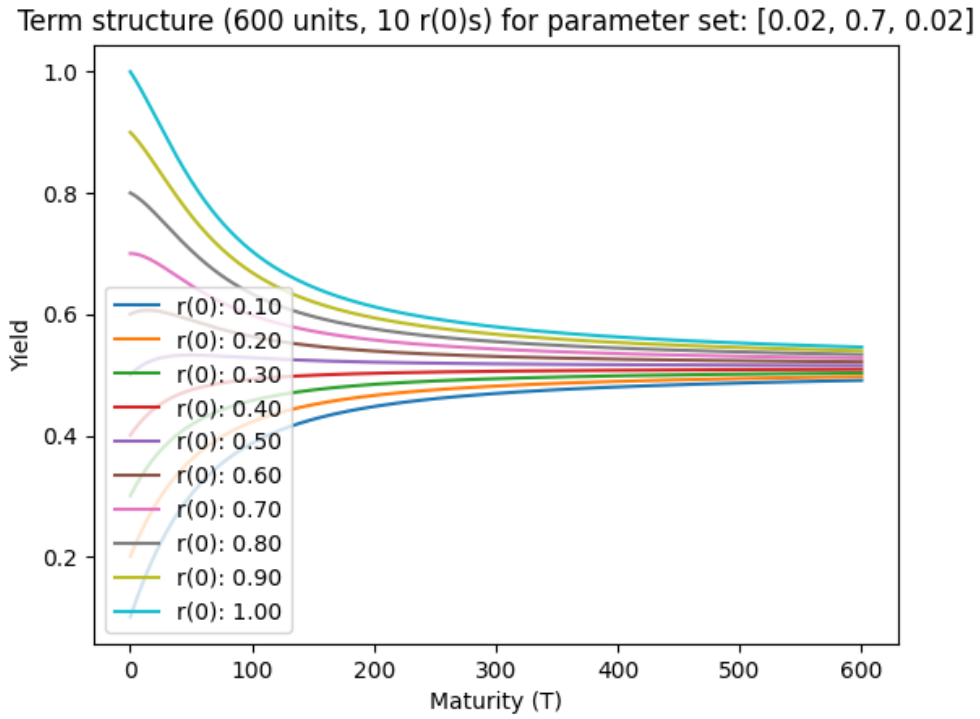
b) [0.7, 0.1, 0.3, 0.2]



c) [0.06, 0.09, 0.5, 0.02]



Yield curves for maturity upto 600 time units for different interest rates.



Observations:

- Regardless of the starting interest rate, bond yields eventually settle at a specific value as the maturity period gets very long.

- The behaviour of interest rates over short periods (like 10 units) can vary significantly. In the first case, it rises rapidly and but doesn't seem to converge. In the second case, it decreases rapidly and then converges. In the third case, it first rises and the converges at a lower value, thus creating a hump.

- The Vasicek model captures the tendency for interest rates to return to a central level (mean reversion). High starting rates tend to decrease over time, and low rates tend to increase, both approaching a common value.