

## CQF Exercises 4.3 Calibration

1. Substitute the fitted function for  $A(t; T)$ , using the Ho & Lee model, back into the solution of the bond pricing equation for a zero-coupon bond,

$$Z(r, t; T) = \exp(A(t; T) - r(T - t)).$$

What do you notice?

2. Differentiate Equation (2) on page 19 of the lecture notes, twice to solve for the value of  $\eta^*(t)$ . What is the value of a zero-coupon bond with a fitted Vasicek model for the interest rate?
3. Use spot rate data to find  $\nu$  and  $\beta$  if we assume that interest rate movements are of the form

$$dr = u(r) dt + \nu r^\beta dX.$$

Does your estimated value of  $\beta$  lie close to that of any of the standard models? (Use any finance based website to download interest rate data for this question).