

## TD3 Cash flows

**Exercise 1.** Suppose a 10000 par bond has 6% semi-annual coupons and matures in 10 years. What is the yield rate if the price is 9000 ?

**Exercise 2.** An investor is considering two projects :

(a) The first project requires an investment of 10,000\$ now. In return, the investor will receive six annual payments of 2100\$, the first of which will be done one year after the investment.

(b) The second project also requires an investment of 10,000\$ now, but it requires a further investment of 2500\$ one year later. In return, the investor will be paid 8500\$ in four years' time and another 8500\$ in seven years' time.

Compute the net present values of both investments, on the basis of an interest rate of 4%. Which is the better investment based on this computation ?

**Exercise 3.** Consider the two cash flow sequences  $a = (12, 12, 12, 20, 24)$  and  $b = (20, 18, 14, 12, 12)$  at times  $t = 0, \dots, 4$ . Find the net present values of the two cash-flows assuming an interest rate of (a) 3% and (b) 10%. Note that  $\sum_{j=0}^4 a_j = 80$  and  $\sum_{j=0}^4 b_j = 76$  and so  $a$  seems preferable.

**Exercise 4.** An investment of 50,000\$ is made in an annuity. The annuity pays out the amount  $a$ \$ at the end of each of the years 1, 2, ..., 20. Suppose the investment gives a yield of 7%. Find  $a$ .

**Exercise 5.** Suppose someone plans to save the same amount  $a$ \$ at the beginning of every month for the next 240 months. This person then intends to withdraw  $c$ \$ at the beginning of every month for the subsequent 360 months. Assume the interest rate is  $i$  per annum compounded monthly. Find an expression for  $a$  in terms of  $i$  and  $c$ .