

Statistics 251b/551b, spring 2009
Homework #5
Due: Monday 23 February

- [1] [20+20 points] Chang Problem 4.6.
- [2] [20+20 points] Chang Problem 4.8.
- [3] [20 points] Complete the stopping time argument for the gambler's ruin problem with $p \neq q$, as begun in class on Wednesday 18 February. You may assume that the game end in a finite time, with probability one. That is, you may assume that $\mathbb{P}\{\tau < \infty\} = 1$. Be sure to explain carefully how you pass from the equality involving $\tau \wedge k$ to the limit.
- [4] [20 points] Repeat the arbitrage calculation regarding the single period derivative security, as discussed in Example 4.21 of the Chang notes, but this time suppose there is a nonzero interest rate. That is, for some fixed and known $r > 0$, a bond purchased for \$1 at time 0 return $\$(1+r)$ at time 1. You will need to determine a portfolio of stocks and bonds that will duplicate the return from the security X . Make sure you explain clearly your arbitrage argument for determining the price for X .
- [5] [bonus points] Chang Problem 4.10.