

Problem Set 3G
Due: February 23, 2005

- G0. Omit Question 2 in Problem Set 3.
- G1. Let X be a binomial random variable with parameters (n, p) . What value of p maximizes $\mathbf{P}(X = k)$, $k = 0, 1, \dots, n$? This is an example of a statistical method used to estimate p when a binomial (n, p) random variable is observed to equal k . If we assume that n is known, then we estimate p by choosing that value of p that maximizes $\mathbf{P}(X = k)$. This is known as the method of maximum likelihood estimation.
- G2. A spider and a fly move along a straight line. At each second, the fly moves a unit step to the right or to the left with equal probability $p < 1/2$, and stays where it is with probability $1 - 2p$. At each second, the spider takes a unit step in the direction of the fly. The spider and the fly start d units apart, where d is a random variable taking positive integer values with a given PMF. If the spider lands on top of the fly, it's the end. Find an expression for the expected value of T , the time it takes for this to happen.