Numerical Methods for Physicists
Problem Set 7
Due April 20, 2007

1. The file distance.dat (posted on the Web site) shows measurements of the distance fallen by an object as a function of time. The first column is the time, t, the second is the measured distance, s, and the third is the 1 sigma uncertainty in the measured distance.

   Consider the (composite) null hypothesis that the object has a uniform acceleration, g.

a) Using the first one second of data ONLY, obtain the value of g that minimizes the χ^2 and determine the minimum value χ^2_{min}. If the null hypothesis is correct, what is the probability that a minimum value that large could have occurred by chance?

b) Repeat a), now using the full ten seconds of data. Explain what is going on.