

1. Develop two functions, one that calculates  $s^2$  using the formation definition, and one that calculates  $s^2$  based on the hand calculation equation. Generate data from a normal distribution. Use your functions to calculate  $s^2$  for your generated data. Try this for various variances so that your data become closer and closer to the mean (less variance). What do you find, comment.
2. Write a program to compute  $e^{-12}$  using Taylor series (i.e.  $e^x = \sum_{i=0}^{\infty} \frac{x^i}{i!}$ ) and also a program for  $e^{-12} = 1/e^{12}$  where the denominator is a Taylor series. Discuss your findings and try to explain.
3. Textbook 2.1.a
4. Use the data from Textbook 2.1.a but using Fisher's scoring rather than Newton-Raphson.
5. Textbook 2.1.b