ST740 Homework #2
Due: in class on Feb 17

Homework format: Please label all problems clearly and turn in an organized homework assignment. You don’t need to spend hours producing beautifully typeset homework, but if I can’t find an answer or read it, you won’t get credit. Turn in the following (as appropriate for the problem):

- the theoretical derivation
- nicely formatted output with an explanation of your solution, written in complete sentences
- the appropriate graphics (label well, including titles and axis labels)
- the final computer code used to answer the problem (attached to the end of your homework)

Problems

1. Problem 2.1

2. Problem 2.8: do as best you can in R

3. This problem is based on Problem 2.11, but there are several changes. Do the following:

   (a) As described in Problem 2.11, develop an R program to estimate \( \hat{\gamma}(h) \). You can get estimates of the standard errors for \( \beta \) in R, but follow the directions given in the problem to create a new program to estimate these standard errors. Estimate the standard errors for the scallops data using the spherical covariance function. Use Euclidean distance.

   (b) Repeat part (a) using geodesic distance. Do your estimates change? Describe. Also, compare the estimated covariance parameters computed using the two methods to estimate distance between points.

   (c) Describe either one method to estimate the standard errors of the covariance parameters from a spatial model or describe the difficulties with estimating these standard errors.

4. Show algebraically that \( \hat{\gamma}(h) \neq \hat{c}(0) - \hat{c}(h) \) for all \( h \) where \( \hat{\gamma}(h) \) is given in (2.9) and \( \hat{c}(h) \) is given in (2.15).