

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 $\widehat{\text{Var}}(\hat{\beta})$. You can get estimates of the standard errors for β 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).