Homework 6 - Stat 534
Due Friday, Feb. 24, 2017

1. Refer to the 7 point ordinary kriging example we discussed in class. Repeat the example with the following changes. We move point $\mathbf{s}_3$ to $(22, 22)$ and point $\mathbf{s}_5$ to $(15, 20)$. Compare and contrast the results to the example being sure to address the following. You need to be careful with the nugget effect and range parameters.

   Recall that Model D is a pure nugget effect model. You do not need the above function to fit that one. A table showing predictions, kriging variances, and weights will help.

   (a) Do the same conclusions regarding the effects of the sill, range, and nugget effect still hold?

   (b) Which points are screening?

   (c) What happens to the kriging variance?

   (d) In which models does the predicted value change and in which does it stay the same?

2. We are going to use ordinary kriging to predict values of total carbon over a grid. You should still have the carbon/nitrogen data set from the last homework but let me know if you need to have it emailed to you. Choose your grid to be the same as in the CN ratio example I worked in class. Set up R code is below.

```
pred.grid<-expand.grid(seq(-50,550,l=100),seq(-15,330,l=100))
TC.geodat<-as.geodata(CN.dat,coords.col=1:2,data.col=4)
```

   We will work with total carbon (column labelled `TC` in the data set) in this problem. You can use either the `ksline` or `krige.conv` functions. Be a bit patient; it should take only a minute or so. Don't worry about anisotropy.

   (a) Plot the data using

   ```
   plot(TC.geodat)
   ```

   Do you see any evidence of trend? Outliers? Other potential anomalies?

   (b) Predict using global ordinary kriging. You estimated a semivariogram for these data on the last homework and you can use those results. Prepare contour plots of the predictions and kriging standard errors.

   (c) Evaluate the predictions using cross validation (CV2). You can use the R code I provided in class notes.

   (d) Briefly discuss your results.