Problem 1
Consider the spatial locations for the ozone monitoring stations in California. You can access them here:

```r
a <- read.table("http://www.stat.ucla.edu/~nchristo/statistics_c173_c273/coords.txt", header=TRUE)
```

Answer the following questions:

a. Using the Cholesky decomposition method and assuming multivariate normal data with mean \( \mu = 0.10 \) and variance covariance matrix \( \Sigma \), simulate manually the following isotropic process: Exponential model with \( c_0 = 0, c_1 = 0.05, \alpha = 2.8 \).

b. Compute the sample semivariogram and fit the exponential model to it. On the same graph plot the theoretical model used in (a).

Problem 2
For this exercise please select a US state or a country to answer the following questions.

a. Generate a regular grid of points similar to this one and select only the points within the map.

b. Using the method of spectral decomposition generate data that exhibit geometric anisotropy in the directions N-S, E-W. (The axes of the ellipse of the rose diagram are parallel to the original coordinates so there is no need to rotate the coordinate system.) Note: Use a covariance function and parameters of your choice.

c. Detect the anisotropy using a rose diagram and transform the coordinates so that the data are now isotropic. Compute and plot the omnidirectional variogram and fit a model to it.