1. Use the data **Ksat** from GEOR. This dataset consists of 32 measurements of the saturated hydraulic conductivity of a soil.

   (a) Produce a quick summary of the data.

   (b) Visualize the locations of the data in the x-y plane.

   (c) Investigate the spatial distribution of the data values using point sizes, patterns and colours that are proportional to the data values or specified quantiles.

   (d) Plot a sample variogram.

   (e) Plot the sample variogram and the power variogram with two covariance parameters equal 0.6 and zero nugget in the same plot.

   (f) Compute and plot the directional variogram for 90 degrees.

   (g) Compute and plot in the same image directional variograms for 4 standard directions.

   (h) Use the information about coordinates and values of the observations in Ksat$coords and Ksat$data respectively to fit a second order polynomial spatial trend.

   (i) Produce maps of the trend and residuals using the function points(...) with grey shades.

2. Use the exponential variogram model from geoR. To produce the following plots use the x-range [0,2].

   (a) Plot 10 sample variograms in the same picture for the first covariance parameter changing from 0.1 to 1 with the step 0.1. The second covariance parameter equals 0.3 and the nugget is 0.

   (b) Plot 10 sample variograms in the same picture for the second covariance parameter changing from 0.1 to 1 with the step 0.1. The first covariance parameter equals 1 and the nugget is 0.

   (c) Plot 10 sample variograms in the same picture for the nugget changing from 0.1 to 1 with the step 0.1. The first and second covariance parameters equal 1 and 0.3 respectively.