Gridding random data with SURFER

when you grid or contour, you are interpreting your data

SURFER is a grid-based contouring program that uses gridded data to create the images and contour maps. Gridding is the process of interpolating irregularly located data onto a regularly spaced array of points. DEMs are gridded data sets. Usually one does not collect geologic data on a regular grid – often some places you wish to sample are simply not accessible. When you have randomly distributed data, they have to be gridded before SURFER can contour them. For some additional reading and background information check out:

- Davis (1986; in course references) includes a good section on the theory of gridding and contouring.

There are many different ways to grid data; SURFER allows a choice from among eight alternative techniques. Two common ways to grid geologic data are by minimum curvature and Kriging; using radial basis functions is often a viable alternative. Minimum Curvature generates smooth surfaces and is fast for most data sets. It has the additional advantage that many geologic data sets (groundwater, stress/strain, heat flow, gravity, magnetics chemical diffusion, etc.) have their mathematical basis in Laplace’s equation as does the minimum curvature method. Minimum curvature commonly produces edge effects (unrealistic highs and lows) beyond the boundaries of the supplied data.

Kriging is one of the more flexible methods and is useful for gridding almost any type of data set. With most data sets, Kriging with a linear variogram is quite effective; it is the default in SURFER and the method most commonly recommended by Golden Graphics. Kriging is the default gridding method because it generates the best overall interpretation of most data sets. For larger data sets, however, Kriging can be rather slow.

General Steps from Surfer Tutorial

http://www.geo.utep.edu/pub/avila/web/index_UTEP.html

For the lab:

A) Create your grid from the xls file. (Minimum Curvature)
   Use the data sheet (.xls) from the web page. For your X, Y, Z

B) Create a Contour map of this Grid

C) Plot your X, & Y in your map

D) Create a 3D surface of your data!

To turn in a Contour map for your Bouguer anomaly, and explain what are the lows and highs for your anomalies.

Hint: your data was gathered and modified from the book page 377. Table 6.4