Subject: Comparing meshes
Posted by James Kuyper on Thu, 07 Sep 2006 15:08:13 GMT
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I have two seperate sets of two-dimensional arrays of latitude, longitude, and altitude. For the first set, the latitude, longitude, and altitude are supposed to be a good approximation of the point on the surface of the earth at the center of an image pixel. For the second set, the longitude, latitude, and altitude are supposed to be a good approximation to weighted averages integrated over the entire pixel. Note that this means the latitudes and longitudes of the second set are not exactly the same as those of the first set.

The spacing of the latitudes and longitudes varies smoothly from 1k to 4km, due to foreshortening and range effects, and also varies irregularly due to terrain correction. The vector difference has an average with a magnitude of 18 centimeters, but an RMS value of 38 meters, and a maximum magnitude of 2011 meters; these are plausible values given the nature of the data and the algorithm used.

Because of the averaging, the second set is expected to make a smoother surface than the first set. I'm trying to figure out two things:
a) is there any mathematical measure of surface smoothness that I can apply to an irregular grid like this?
b) what's the best way to display the surfaces so that the greater smoothness of the second one is clearly visible? I've not attempted to visualize it yet, but I'd expect a difference of 38 meters to be hard to see when the grid spacing is 1000 meters.