Subject: cartesian to spherical plotting problem
Posted by workmanj1 on Fri, 19 Dec 2008 18:57:08 GMT
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So, I am having trouble figuring out how to properly map cartesian data onto a spherical surface. Here is the jist of what I am trying to do.

Imagine that I have a spherical ball of uniform density and radius R centered about (0,0,0). At every point on the ball I have a position vector defined by (x,y,z) and a value rho (constant at all points for simplicity). For each point I calculate a normalized position vector from which I can determine the theta (latitude) and phi (longitude) of the vector, r is unity so the space spans the surface of a sphere. I then want to generate a lon/lat 2d array which maps out the entire surface and put ALL of the rho with a given lon,lat onto that surface of the sphere.

For example, if n points span the distance from (0,0,0) to (R,0,0) and I have a corresponding lon,lat of (pi/2,pi/2) then I want that point on my 2d array to be n*rho.

Simply binning the value leaves me with geometrical issues as well as undersampling of points at certain lon,lat coordinates due to the geometry transform. I believe that dividing by sin(lat) at each points properly normalizes the areas but I am not sure. I'd also like to be able to interpolate the values at the undersampled regions. Ultimately I need to feed this to a mollweide projection which I know how to do.

So far all of IDLs routines seem to throw away redundant data which is the opposite of what I want. I think adaptive kernel smoothing might work but am unfamiliar with how to use it. Does anyone have any suggestions?

My final use will to be to bin total mass by a coordinate sphere determined by unit angular momentum but the procedure is equivalent to what I have outlined above and I know that the result of what I outlined above should be an array and map of equal value at all points.

Thanks in advance.