

Re: Calculating a Distance on the Surface of the Earth

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On Jan 27, 6:47 pm, Victor Fraenckel <vict...@xxxxxxxxxxxxxx> wrote:

O.B. wrote:

I've managed to summarize the problem I'm trying to solve in the PDF below. Basically, I have a point on the earth's surface at a given latitude and longitude. If I moved 200km away from this point to the East, I'd actually be above the surface of the earth due to the curvature of the earth. If at the point, I were to drop straight down to the surface of the earth, I'd like to know the distance between this new point on the earth and the original point. I'd like to repeat this calculation with heading 200km to the North. Help?

<http://www.dafunks.com/misc/EllipseProblem.pdf>

O.B.

I am not sure I understand what you want to calculate. I can provide you with a PDF of a paper by T. Vincenty in which he published algorithms that will allow you to:

1.
Given: The latitude/longitude of a point on the earth's surface and the distance and direction to a second point, compute the latitude and longitude of the second point.
2.
Given: The latitude and longitude of two points on the earth's surface, compute the distance between the points and the azimuths of each point from the other.

If this is helpful I would be glad to send you the paper.

Vic

Re: Calculating a Distance on the Surface of the Earth

I'm definitely interested in the paper, but I'm not sure how it will help me.

Basically, I am trying to plot a couple of 2D circles on the earth, each given a center point in latitude and longitude degrees and a radius in meters (200 km in the example). Think of the circle as a rigid flat 2D surface that is laid on top of the earth at sea-level centered at the given latitude and longitude. Since the earth is not flat, the circumference of the circle does not touch the earth. By dropping the edge of the circle straight down (as noted in the PDF), the circle then becomes an ellipse since the earth is an ellipsoid.

At this point, one can visually see that the distance between the center of the circle and the new edge (on the earth surface) is greater than 200km. My question is how to calculate exactly what this new distance is? That is, the distance between the center and the far east edge as well as the distance between the center the far north edge.

I'm using Gnuplot to make the 2D plot. I need to know the distance between the center point and the far east point (range1) as well as the distance between the center point and the far north point (range2) in degrees to perform the plot. So assuming x and y are the center points in latitude and longitude degrees, I'd issue the following commands to plot the ellipse:

```
set parametric
set trange[0:2*pi]
plot x + range1 * cos(t), y + range2 * sin(t) title 'RoI_1'
```

All I really need to know is the algorithm to calculate the two distances in meters; I already have algorithms in place to covert the distances to degrees.

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