
Subject: Vectorized versions of MAP_2POINTS and LL_ARC_DISTANCE

Posted by [Kenneth P. Bowman](#) on Thu, 08 Apr 2010 15:05:08 GMT

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Following up on my post last week, I have added ARC_AZIMUTH_KPB and LL_ARC_AZIMUTH_KPB, which are vectorized versions of MAP_2POINTS and LL_ARC_DISTANCE, to my shared IDL library

http://csrp.tamu.edu/downloads/idl/bowman_lib.zip

For my application these routines sped-up the calculation by a factor of 50 compared with using loops to call the built-in routines (10 s instead of 500 s). YMMV.

For consistency and simplicity I made a number of changes to the calling sequences (procedure names, argument lists, and keywords).

ARC_AZIMUTH_KPB computes great-circle arc distances and azimuths between a set of initial points (x0, y0) and final points (x1, y1). This implements part of the functionality of the built-in routine MAP_2POINTS. The other functions of MAP_2POINTS are not implemented in ARC_AZIMUTH_KPB.

LL_ARC_AZIMUTH_KPB computes the longitudes and latitudes (x1, y1) of points that are located given great-circle arc distances and azimuths from a set of initial points (x0, y0). This procedure is essentially equivalent to LL_ARC_DISTANCE.

Because the procedures both return *two* quantities (arc distances and azimuths or longitudes and latitudes), I chose to write these as procedures rather than functions. I prefer having the output values as separate arrays, and I don't have to make an assumption about the order of indices (n x 2 vs. 2 x n).

Variable names and units are consistent in the two new procedures. The default unit for all angles is degrees for *both* procedures. The RADIANS keyword can be used to specify that angles are in radians. If you want to know the physical distance along the arcs, rather than the angular distance, you can compute that outside of these procedures by multiplying the arc distance by the radius of the sphere (and converting to radians, if necessary).

There are two simple test routines in the 'test' subdirectory that compare the output of my routines with the built-in routines.

These procedures have not been tested much beyond what is in the test routines, so if you encounter any problems, please let me know.

Enjoy, Ken
