Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by natha on Wed, 11 Mar 2009 19:49:41 GMT
View Forum Message <> Reply to Message

I found MAP_PROJ_FORDWARD function to convert lat/lon to cartesian
coordinates. So, calculate the distance between 2 cartesian points
it's eaasy.

The problem is when I use this function. The following problem ocurs:

alb_cart=MAP_PROJ_FORWARD(-73.83,42.70)
% MAP_PROJ_FORWARD: Value of Projection index is out of allowed range.
% Execution halted at: $MAIN$

(-73.83,42.70) are a valid lat/lon coordinates of station situated in
Albany, USA.
MAP_STRUCTURE is required to use this function (MAP_PROJ_FORWARD) but
I don't know which mapping projection use.

Any suggestions !?

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by Bruce Bowler on Wed, 11 Mar 2009 20:07:24 GMT
View Forum Message <> Reply to Message

On Wed, 11 Mar 2009 12:49:41 -0700, llo wrote:

> I found MAP_PROJ_FORDWARD function to convert lat/lon to cartesian
> coordinates. So, calculate the distance between 2 cartesian points it's
> eaasy.
>
> The problem is when I use this function. The following problem ocurs:
>
> alb_cart=MAP_PROJ_FORWARD(-73.83,42.70) % MAP_PROJ_FORWARD: Value of
> Projection index is out of allowed range. % Execution halted at: $MAIN$
>
> (-73.83,42.70) are a valid lat/lon coordinates of station situated in
> Albany, USA.
> MAP_STRUCTURE is required to use this function (MAP_PROJ_FORWARD) but I
> don't know which mapping projection use.
>
> Any suggestions !?

Eqn's for doing anything you want with lats and longs can be found here...

http://williams.best.vwh.net/avform.htm

Converting them to IDL is left as an exercise for the reader (warning - be careful with your signs if you use his formulae, the fly-boys appear to be out of step with the rest of the world :-)

Bruce

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by natha on Wed, 11 Mar 2009 20:21:21 GMT
View Forum Message <> Reply to Message

I tried the following formula I found in your link:

Distance between points

The great circle distance d between two points with coordinates {lat1,lon1} and {lat2,lon2} is given by:

d=acos(sin(lat1)*sin(lat2)+cos(lat1)*cos(lat2)*cos(lon1-lon2))

A mathematically equivalent formula, which is less subject to rounding error for short distances is:

d=2*asin(sqrt((sin((lat1-lat2)/2))^2 + cos(lat1)*cos(lat2)*(sin((lon1-lon2)/2))^2))

the result is 0.8777. 0.8777 distance from montreal to albany ????

Doesn't works !

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by David Fanning on Wed, 11 Mar 2009 20:33:48 GMT
View Forum Message <> Reply to Message

llo writes:

> I tried the following formula I found in your link:
>
> Distance between points
>
> The great circle distance d between two points with coordinates
> {lat1,lon1} and {lat2,lon2} is given by:

>
> d=acos(sin(lat1)*sin(lat2)+cos(lat1)*cos(lat2)*cos(lon1-lon2))
>
> A mathematically equivalent formula, which is less subject to rounding
> error for short distances is:
>
> d=2*asin(sqrt((sin((lat1-lat2)/2))^2 + cos(lat1)*cos(lat2)*(sin((lon1-
> lon2)/2))^2))
>
> the result is 0.8777. 0.8777 distance from montreal to albany ????

Try MAP_2POINTS in the IDL distribution.

Cheers,

David

--
David Fanning, Ph.D.
Coyote's Guide to IDL Programming (www.dfanning.com)
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by KRDean on Wed, 11 Mar 2009 20:44:06 GMT
View Forum Message <> Reply to Message

On Mar 11, 1:33 pm, llo <bernat.puigdomen...@gmail.com> wrote:
> I am working on a project where I will be receiving measurements from
> the Global
> Positioning System, presumably latitude and longitude measurements,
> and I will
> need to calculate the distances between the measurement points. The
> measurements
> will all be taken over a region of only a few miles so I guess I could
> assume
> the earth is flat over this region and just calculate the straight
> line
> distance.
>
> But I was wondering if anyone could help me with a more mathematically
> rigorous method for calculating distance from pairs of latitude/
> longitude
> measurements?
>
> thanks,
>

> llo

dito to MAP_2POINTS and don't forget about LL2RBE from JHU/APL
distribution.

Kelly Dean
Fort Collins, CO

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by natha on Wed, 11 Mar 2009 21:12:29 GMT
View Forum Message <> Reply to Message

I wrote this small program:

```
FUNCTION LATLON_DISTANCE, lat1, lon1, lat2, lon2, DEG=deg

  IF KEYWORD_SET(deg) THEN BEGIN
    lat1=lat1*(!PI/180.)
    lon1=lon1*(!PI/180.)
    lat2=lat2*(!PI/180.)
    lon2=lon2*(!PI/180.)
  ENDIF

  R=6356.7523 ;; polar radius [km]

  a=R*(!PI/2.-lat2)
  b=R*(!PI/2.-lat1)

  gamma=lon1-lon2

  angle=COS(b/R)*COS(a/R)+SIN(b/R)*SIN(a/R)*COS(gamma)
  distance=ACOS(angle)*R

  RETURN, distance

END
```

The result is the same as MAP_2POINTS.
I'll use MAP_2POINTS anyway,

thanks

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?

Posted by mankoff on Thu, 12 Mar 2009 12:02:59 GMT
View Forum Message <> Reply to Message

On Mar 11, 4:33 pm, llo <bernat.puigdomen...@gmail.com> wrote:
> I am working on a project where I will be receiving measurements from
> the Global
> Positioning System, presumably latitude and longitude measurements,
> and I will
> need to calculate the distances between the measurement points. The
> measurements
> will all be taken over a region of only a few miles so I guess I could
> assume
> the earth is flat over this region and just calculate the straight
> line
> distance.
>
> But I was wondering if anyone could help me with a more mathematically
> rigorous method for calculating distance from pairs of latitude/
> longitude
> measurements?
>
> thanks,
>
> llo

As mentioned below map_2points works. I've found distance_sphere (in the ICG library) to be handy because it works with vectors.

-k.

Subject: Re: how to calculate distance from pairs of latitude/longitude measurements?
Posted by Jeremy Bailin on Thu, 12 Mar 2009 14:20:45 GMT
View Forum Message <> Reply to Message

On Mar 12, 8:02 am, mankoff <mank...@gmail.com> wrote:
> On Mar 11, 4:33 pm, llo <bernat.puigdomen...@gmail.com> wrote:
>
>
>
>> I am working on a project where I will be receiving measurements from
>> the Global
>> Positioning System, presumably latitude and longitude measurements,
>> and I will
>> need to calculate the distances between the measurement points. The
>> measurements
>> will all be taken over a region of only a few miles so I guess I could

>> assume
>> the earth is flat over this region and just calculate the straight
>> line
>> distance.
>
>> But I was wondering if anyone could help me with a more mathematically
>> rigorous method for calculating distance from pairs of latitude/
>> longitude
>> measurements?
>
>> thanks,
>
>> llo
>
> As mentioned below map_2points works. I've found distance_sphere (in
> the ICG library) to be handy because it works with vectors.
>
> -k.

...or SPHDIST in the Astronomy User's Library.

-Jeremy.
