
Subject: Re: create an UTM grid

Posted by [David Fanning](#) on Mon, 28 Nov 2011 18:12:15 GMT

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nata writes:

> I am trying to create an UTM grid. I never did something similar and I
> got the idea from the last IDL webinar...
> What I want is a grid centered in a center point and I would like to
> have the lat/lon values associated to every pixel. Lets say that I
> want a grid of 500x500 km centered on -74lon 45lat, is there a way to
> create that grid ?
>
> What I tried until now is something like :
>
> map_utm = MAP_PROJ_INIT('UTM', CENTER_LONGITUDE=-74
> CENTER_LATITUDE=45, ELLIPSOID=24)
> llrange = MAP_PROJ_INVERSE([-500000.,500000], [-500000.,500000.],
> MAP_STRUCTURE=map_utm)
>
> Maybe it's not that simple so that's why I call your wisdom to help me
> with this. Thank you in advance,

This is almost right. When you set up a UTM projection, the CENTER_LONGITUDE and CENTER_LATITUDE keywords are actually used to choose the correct UTM zone, not really to center the map projection in that zone. To center the grid, you will have to project your center latitude and longitude into XY coordinates, then create your grid:

```
mapStruct = Map_Proj_Init('UTM', /GCTP, $
    Center_Lon=-74, Center_Lat=45, Ellipsoid=24)
xycenter = Map_Proj_Forward(-74, 45, Map_Structure=mapStruct)
xrange = [xycenter[0]-250000, xycenter[0]+250000]
yrange = [xycenter[1]-250000, xycenter[1]+250000]
ll = Map_Proj_Inverse(xrange, yrange, Map_Structure=mapStruct)
Print, 'Longitude Range: ', ll[0,0], ll[0,1]
Print, 'Latitude Range: ', ll[1,0], ll[1,1]
```

The actual grid will be determined by how many "cells" you want to have in your data range. In other words, how big do you want each cell of your grid to be? Or, what is the resolution of your grid? If you want each cell to be, say 5000 meters on a side, then your grid would be a 100x100 array.

```
IDL> Print, (xrange[1] - xrange[0]) / 100
5000.000
```

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.idlcoyote.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: create an UTM grid

Posted by [natha](#) on Mon, 28 Nov 2011 19:25:36 GMT

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Thank you David. Just to be sure, if I want a grid of 1000x1000, 1km resolution and centered on 45.42419lat -73.9372lon, is the following code right ?

```
center_lat=45.42419
center_lon=-73.9372
xdim=1000
ydim=1000
resolution=1000.
```

```
map_utm=MAP_PROJ_INIT('UTM', /GCTP, CENTER_LON=center_lon,
CENTER_LAT=center_lat, ELLIPSOID=24)
```

```
xycenter=MAP_PROJ_FORWARD(center_lon, center_lat,
MAP_STRUCTURE=map_utm)
```

```
x_grid=xycenter[0] + FINDGEN(xdim)*resolution - xdim/2.*resolution
y_grid=xycenter[1] + FINDGEN(ydim)*resolution - ydim/2.*resolution
```

```
result = MAP_PROJ_INVERSE(x_grid, y_grid, MAP_STRUCTURE=map_utm)
```

```
lon=REFORM(result[0,*])
lat=REFORM(result[1,*])
```

Thank you again ! I really appreciate your support !
nata

Subject: Re: create an UTM grid

Posted by [natha](#) on Mon, 28 Nov 2011 20:02:25 GMT

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I think the following code is better :

```
x_grid=REBIN(x_grid,xdim,ydim,/SAMPLE)
y_grid=TRANSPPOSE(REBIN(y_grid,ydim,xdim,/SAMPLE))

result=MAP_PROJ_INVERSE(x_grid, y_grid, MAP_STRUCTURE=map_utm)

res_lon=REFORM(result[0,*],xdim,ydim)
res_lat=REFORM(result[1,*],xdim,ydim)
```

By the way, I am missing something here...

UTM is a cartesian coordinate system. Theoretically, the distance between two points on the grid could be performed using the Pythagorean theorem (because all distances should be equal). What I realize is that the distances are different and never equal to 1km. I checked that using the routine MAP_2POINTS. Do you know why ?

Subject: Re: create an UTM grid
Posted by [David Fanning](#) on Mon, 28 Nov 2011 22:33:17 GMT
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nata writes:

```
> Thank you David. Just to be sure, if I want a grid of 1000x1000, 1km
> resolution and centered on 45.42419lat -73.9372lon, is the following
> code right ?
>
> center_lat=45.42419
> center_lon=-73.9372
> xdim=1000
> ydim=1000
> resolution=1000.
>
> map_utm=MAP_PROJ_INIT('UTM', /GCTP, CENTER_LON=center_lon,
> CENTER_LAT=center_lat, ELLIPSOID=24)
>
> xycenter=MAP_PROJ_FORWARD(center_lon, center_lat,
> MAP_STRUCTURE=map_utm)
>
> x_grid=xycenter[0] + FINDGEN(xdim)*resolution - xdim/2.*resolution
> y_grid=xycenter[1] + FINDGEN(ydim)*resolution - ydim/2.*resolution
>
> result = MAP_PROJ_INVERSE(x_grid, y_grid, MAP_STRUCTURE=map_utm)
>
> lon=REFORM(result[0,*])
> lat=REFORM(result[1,*])
```

Well, something like that. :-)

More like this, I think. (Maybe this is what you had.)

```
mapStruct = Map_Proj_Init('UTM', /GCTP, $
    Center_Lon=-74, Center_Lat=45, Ellipsoid=24)
xycenter = Map_Proj_Forward(-74, 45, Map_Structure=mapStruct)
xstart = [xycenter[0]-49995
ystart = [xycenter[1]-49995
```

```
xgrid = Findgen(1000)*1000 + xstart
ygrid = Findgen(1000)*1000 + ystart
```

```
xdim = 1000
ydim = 1000
```

```
xgrid = Rebin(xgrid, xdim, ydim)
ygrid = Rebin(Reform(ygrid, 1, ydim), xdim, ydim)
```

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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Subject: Re: create an UTM grid

Posted by [David Fanning](#) on Mon, 28 Nov 2011 22:35:28 GMT

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nata writes:

- > UTM is a cartesian coordinate system. Theoretically, the distance
- > between two points on the grid could be performed using the
- > Pythagorean theorem (because all distances should be equal). What I
- > realize is that the distances are different and never equal to 1km. I
- > checked that using the routine MAP_2POINTS. Do you know why ?

I think mostly because you are not following my advice exactly. ;-)

In my grids, the distances are *exactly* 1000 meters apart.

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: create an UTM grid

Posted by [David Fanning](#) on Mon, 28 Nov 2011 22:38:49 GMT

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David Fanning writes:

```
> xstart = [xycenter[0]-49995
```

```
> ystart = [xycenter[1]-49995
```

Sorry, this should have been 50000-500=49500:

```
xstart = [xycenter[0]-49500
```

```
ystart = [xycenter[1]-49500
```

Cheers,

David

--

David Fanning, Ph.D.

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