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gctp - Initializes projection transformation parameters and performs transformations.

SYNTAX

FUNCTION gctp (incoor, insys, inzone, inparm, inunit, indatum, ipr, efile, jpr, pfile, outcoor, outsys, outzone, outparm, outunit, outdatum, fn27, fn83, iflg)

```
double       incoor[2];
long        *insys;
long        *inzone;
double       inparm[15];
long        *inunit;
long        *indatum;
long        *ipr;
char         efile[];
long        *jpr;
char         pfile[];
double       outcoor[2];
long        *outsys;
long        *outzone;
double       outparm[15];
long        *outunit;
long        *outdatum;
char         fn27[];
char         fn83[];
long        *iflg;
```

PARAMETERS

incoor (input, double, length(2))

Array of two input coordinates (X-Y, Longitude-Latitude, Northing-Easting, etc) to be translated. The nature of the coordinates is defined by *insys*, *inzone*, and *inunit*. The east-west dimension (X, Longitude, Easting) is first followed by the north-south (Y, latitude, Northing).

insys (input, long)

Defines the input projection system. Valid codes are:

```
=  0:      GEO       (Geographic)
=  1:      UTM       (Universal Transverse Mercator)
=  2:      SPCS      (State Plane Coordinates)
=  3:      ALBERS    (Albers Conical Equal Area)
=  4:      LAMCC     (Lambert Conformal Conic)
```

```
= 5:   MERCAT   (Mercator)
= 6:   PS       (Polar Stereographic)
= 7:   POLYC    (Polyconic)
= 8:   EQUIDC   (Equidistant Conic)
= 9:   TM       (Transverse Mercator)
= 10:  STEREO   (Stereographic)
= 11:  LAMAZ    (Lambert Azimuthal Equal Area)
= 12:  AZMEQD   (Azimuthal Equidistant)
= 13:  GNOMON   (Gnomonic)
= 14:  ORTHO    (Orthographic)
= 15:  GVNSP    (General Vertical Near-Side Perspective)
= 16:  SNSOID   (Sinusoidal)
= 17:  EQRECT   (Equirectangular)
= 18:  MILLER   (Miller Cylindrical)
= 19:  VGRINT   (Van der Grinten)
= 20:  HOM      (Hotine Oblique Mercator--HOM)
= 21:  ROBIN    (Robinson)
= 22:  SOM      (Space Oblique Mercator--SOM)
= 23:  ALASKA   (Modified Stereographic Conformal--Alaska)
= 24:  GOOD     (Interrupted Goode Homolosine)
= 25:  MOLL     (Mollweide)
= 26:  IMOLL    (Interrupted Mollweide)
= 27:  HAMMER   (Hammer)
= 28:  WAGIV    (Wagner IV)
= 29:  WAGVII   (Wagner VII)
= 30:  OBLEQA   (Oblated Equal Area)
```

inzone (input, long)

Input zone for UTM and State Plane projection systems. The UTM Coordinate System (*insys* = 1) and State Plane Coordinate System (*insys* = 2) use zone codes instead of specific projection parameters (See Appendix B--UTM and Appendix C--State Plane). For Southern Hemisphere UTM, use a negative zone code. *Inzone* will be ignored for all other projections.

inparm (input, double, length(15))

Array of fifteen projection parameters. These parameters are required to define each map projection. (See Appendix A)

inunit (input, long)

Unit code for input coordinates. Valid unit codes are:

```
= 0:  radians
= 1:  U.S. feet
= 2:  meters
= 3:  seconds of arc
```

```
= 4:  degrees of arc
= 5:  International feet
= 6:  Table supplying the unit code, which is legislated
      for the State zone selected
```

indatum (input, long)

Input spheroid code. This identifies the semi-major axis and eccentricity that is to be used in the transformation process. If a negative spheroid code is entered, *inparm* elements 1 and 2 are to be used (See Appendix A). Supported spheroids include:

```
=  0:  Clarke 1866 (default)
=  1:  Clarke 1880
=  2:  Bessel
=  3:  International 1967
=  4:  International 1909
=  5:  WGS 72
=  6:  Everest
=  7:  WGS 66
=  8:  GRS 1980
=  9:  Airy
= 10:  Modified Everest
= 11:  Modified Airy
= 12:  WGS 84
= 13:  Southeast Asia
= 14:  Australian National
= 15:  Krassovsky
= 16:  Hough
= 17:  Mercury 1960
= 18:  Modified Mercury 1968
= 19:  Sphere of Radius 6370997 meters
```

Note: State Plane projection (*insys* = 2) only supports Clarke 1866 (*indatum* = 0) and GRS 1980 (*indatum* = 8) spheroids corresponding to datums NAD27 and NAD83 respectively (See Appendix B).

ipr (input, long)

Error message print flag. If *ipr* is zero, error messages will be printed to the terminal. If *ipr* is one, error messages will be printed to *efile*. If *ipr* is two, error messages will be printed to both the terminal and *efile*. If ipr is something else, error messages will not be printed.

efile (input, character, length(*))

The file which will contain the output error messages. *efile* need not be opened at this time.

jpr (input, long)

Projection parameter print flag. If *jpr* is zero, projection parameters will be printed to the terminal. If *jpr* is one, projection parameters will be printed to *pfile*. If *jpr* is two, projection parameters will be printed to both the terminal and *pfile*. If *jpr* is something else, the projection parameters will not be printed. As specified by *jpr*, Projection parameters are printed each time the input projection parameters (*insys*, *inzone*, *inparm*, *inunit*, *indatum*, *outsys*, *outzone*, *outparm*, *outunit*, and *outdatum*) change.

pfile (input, character, length(*))

The file which will contain the output projection parameter messages. *pfile* need not be opened at this time.

outcoor (output, double, length(2))

Array of two transformed coordinates. See *incoor* for an explanation.

outsys (input, long)

Defines the output projection system. See *insys*.

outzone (input, long)

Output zone for UTM and State Plane projection systems. The UTM Coordinate System (*outsys* = 1) and State Plane Coordinate System (*outsys* = 2) use zone codes instead of specific projection parameters (See Appendix B--UTM and Appendix C--State Plane). For Southern Hemisphere UTM, use a negative zone code. *Outzone* will be ignored for all other projections.

outparm (input, double, length(15))

Array of fifteen projection parameters. These parameters are required to define each map projection. (See Appendix A)

outunit (input, long)

Unit code for output coordinates. See *inunit*.

outdatum (input, long)

Output spheroid code. See *indatum*.

fn27 (input, character, length(*))

Name of the file which contains the NAD 1927 State Plane zone parameters.

fn83 (input, character, length(*))

Name of the file which contains the NAD 1983 State Plane zone parameters.

iflg (output, long)

Error flag after transformation. The error number returned will correspond to the specific error.

DESCRIPTION

This routine initializes the proper projection parameters when initialization is required. The proper informational and error message handling is initialized. Then, the *incoor* coordinates are converted from the *insys* map projection to the *outsys* map projection and are returned in *outcoor*.

RETURN VALUE

gctp() has no return value.