

Notes and Usage Page: EGM84/96 Geoid Height Calculations

Program Constraints

-89° 44' 24" <= Latitude <= 89° 44' 24"
-180° <= Longitude <= 360°

The latitude constraint is due to the spline algorithm not selecting points beyond.

± 89° 44' 24'

Usage

If the coordinate is negative, then place a negative sign on the degree value. Placing additional negative signs on minutes and seconds is supported but not required (unless the degree portion is zero). If degrees are positive, then both the corresponding minutes and seconds should be positive. This program uses a north and east positive convention.

Examples of valid input coordinates:

40° 30' 30"
-40° 30' 30"
-40° -30' -30"
0° -10' -20" (Sign required on min/sec for negative coordinate with zero degree)

Examples of invalid input coordinates (combined Lat/Lon cases):

90° 0' 0" (Latitude polar case not allowed)
40° -30' -30" (Positive degrees, negative min/sec)
-185° -10' -20" (Longitude boundary exceeded)

Geoid heights can be used to convert between orthometric heights (approximately mean sea level) and ellipsoid heights according to the formula:

$$h = H + N$$

Where: h = WGS 84 Ellipsoid height
H = Orthometric height
N = WGS 84 Geoid height

Development

EGM84 is based on a spherical harmonic expansion of the disturbing potential to degree and order 180. EGM96 is based on a spherical harmonic expansion of the disturbing potential to degree and order 360. This PERL CGI is using an ANSI C program that performs spline interpolations.