3-D GSDM Computations - BK3 & BK4

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This spreadsheet performs BK3 & BK4 computations on user selected ellipsoid - default is GRS80.

Ellipsoid: GRS80 (The ellipsoid name and parameters may be changed by the user.)

a = 6,378,137.000

1/f = 298.25722210088 $e^2 = 2 * f - f^2$ e^2 = 0.006694380022903

Excel uses angular units of radians for trigonometric functions.
This spreadsheet uses seconds per radian (spr) for conversion - spr = 206,264.806247096

BK3 Input - beginning geocentric coordinates of Pt 1 and coordinate differences - Pt 1 to Pt2.
Output - Geocentric ECEF X/Y/Z rectangular coordinates of Pt 2 in meters.
Notes:

1. If points are on the ellipsoid, this computation is known as the geodetic forward.
2. The epoch of the ECEF coordinates should also be stated.

Equations: $X_2 = X_1 + \Delta X$ $Y_2 = Y_1 + \Delta Y$ $Z_2 = Z_1 + \Delta Z$

Pt 1	NM Initial Point (92)			Differences		**Pt 2**	SW Cor. Sec 31 T23S-R1E	
X_1 =	-1,533,309.9110	m	ΔX =	-35,388.1750	*m*	X_2 =	-1,568,698.0860	m
Y_1 =	-5,050,681.7520	m	ΔY =	-116,425.3680	*m*	Y_2 =	-5,167,107.1200	m
Z_1 =	3,571,149.1940	m	ΔZ =	-185,935.1200	*m*	Z_2 =	3,385,214.0740	m

BK4 Input - geocentric ECEF X/Y/Z rectangular coordinates at two points.
Output - Geocentric coordinate differences between the two points.
Notes: -

1. If points are on the ellisoid, this computation is known as the geodetic inverse.
2. The epoch of ECEF coordinates of both points should be the same and stated.

Equations: $\Delta X = X_2 - X_1$ $\Delta Y = Y_2 - Y_1$ $\Delta Z = Z_2 - Z_1$

Pt 1	NM Initial Point (92)		**Pt 2**	SW Sec 31 T23S-R1E		Differences Pt. 2 - Pt. 1		
X_1 =	-1,533,309.9110	m	X_2 =	-1,568,698.0860	m	ΔX =	-35,388.1750	m
Y_1 =	-5,050,681.7520	m	Y_2 =	-5,167,107.1200	m	ΔY =	-116,425.3680	m
Z_1 =	3,571,149.1940	m	Z_2 =	3,385,214.0740	m	ΔZ =	-185,935.1200	m

Note: It is prudent to perform the computation both ways to check your work!

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