

Geodetic Datum Transformation and Map Projection Parameter Set for Computation between ITRF96 Geodetic Coordinates (or Cartesian Coordinates) and HK1980 Grid Coordinates

Name of Parameter Set : 7P_ITRF96_HK80_V1.0 (Date : 1 March 2002)

Datum Transformation Parameters

	From : ITRF96 (at epoch 1998:121) To: HK80 Geodetic Datum	From : HK80 Geodetic Datum To : ITRF96 (at epoch 1998:121)
Shift along x-axis	162.619 m	-162.619 m
Shift along y-axis	276.961 m	-276.959 m
Shift along z-axis	161.763 m	-161.764 m
Rotation about x-axis	0.067741 "	-0.067753 "
Rotation about y-axis	-2.243649 "	2.243648 "
Rotation about z-axis	-1.158827 "	1.158828 "
Scale factor	1.094239 ppm	-1.094246 ppm

Datum Transformation Equation

$$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{\text{new}} = \begin{bmatrix} \Delta X \\ \Delta Y \\ \Delta Z \end{bmatrix} + \begin{bmatrix} (1+S) & \theta_z & -\theta_y \\ -\theta_z & (1+S) & \theta_x \\ \theta_y & -\theta_x & (1+S) \end{bmatrix} \begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{\text{old}}$$

Where

X : Shift along x-axis
 Y : Shift along y-axis
 Z : Shift along z-axis
 θ_x : Rotation about x-axis
 θ_y : Rotation about y-axis
 θ_z : Rotation about z-axis
 S : Scale factor

$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{\text{new}}$: 3D Cartesian Coordinate in New Geodetic Datum
 $\begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{\text{old}}$: 3D Cartesian Coordinate in Old Geodetic Datum

Map Projection Parameters of the Hong Kong 1980 Grid Coordinates

Geodetic Datum : Hong Kong 1980 Geodetic Datum	Coordinates of Map Projection Centre
Projection : Transverse Mercator	HK1980 Geodetic Coordinates :
Reference Ellipsoid : International 1910	Latitude : 22 18'43.68" N
Semi-Major axis (a) : 6378388m	Longitude : 114 10'42.80" E
Flattening (f) : 1 / 297	HK1980 Grid Coordinates :
Scale factor along central meridian : 1	Northing : 819 069.80 mN
	Easting : 836 694.05 mE

Numerical Data for Checking the Transformation Computation

Users can use the following data to verify the formulae and parameters used.

ITRF96 Geodetic Coordinates	HK1980 Grid Coordinates
Latitude : 22 29' 8.777176" N	Northing : 838 477.970 m
Longitude : 114 00' 1.079932" E	Easting : 818 097.267 m

Enquiry about the map projection and transformation parameters can be made to :

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