



New solutions for closed form transformation of Cartesian to geodetic coordinates

Behzad Behnabian

Department of Geomatics Engineering, University of Tafresh, Tafresh, Islamic Republic Of Iran (behnabian@taut.ac.ir)

The Cartesian to geodetic coordinate transformation problem is modeled as a minimization problem for the height of an object above the reference ellipsoid. Cartesian coordinate of footprint of the object is directly derived and a new closed form solution to transform geocentric rectangular coordinates to geodetic Coordinates is found. This formula is highly precise because the resulting absolute error in height determination over the range from -106 to +1012 m is less than 10-10m also the geodetic latitude can be precisely derived. The numerical stability of transformation for polar and equatorial regions is also considered. Finally the results of this method are compared with other methods proposed by Borkowski and Vermeille .