Fixed garvimetric-altimetry boundary value problem for geoid determination at islands

A. Safari

Department of Surveying and Geomatics Engineering, College of Engineering, University of Tehran, P.O. Box 11155-4563,

A fixed gravimetric-altimetry boundary value problem for geoid computations at islands has been developed and successfully tested. The algorithmic steps of the solution of the fixed garvimetric-altimetry boundary value problem for geoid computations at islands are as follows:

- Application of the ellipsoidal harmonic expansion complete up to degree and order 360 and of the ellipsoidal centrifugal field for removal of the effect of the global gravity from gravity intensity at the surface of the island.

- The removal from the gravity intensity at the surface of the Earth the effect of residual masses at the radius of up to 55 km from the computational point.

-Derivation marine geoid from satellite altimetry data.

- Application of the ellipsoidal harmonic expansion complete up to degree and order 360 and of ellipsoidal centrifugal field for removal from the geoidal undulations derived from satellite altimetry the effect of the global gravity.

- The removal from geoidal undulations derived from satellite altimetry the effect of water masses at the radius of up to 55 km from the computational point.

- Application of Koch and Kusche algorithm (Koch and Kusche, 2002) for derivation of disturbing gravity potential at the surface of the reference ellipsoid from residual gravity intensity and residual gravity potential of satellite altimetry data.

-Restoration of the removed effects on the surface of the reference ellipsoid.

-Application of ellipsoidal Bruns formula in order to compute geoid undulations.

Computation of the geoid of Qeshm Island of Iran has successfully tested this methodology.