DETERMINATION OF THE QUASI GEOID OF SRI LANKA BASED ON EGM2008

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As one of the actual topics in the field of geodesy, Geoid determination has never lost its priority. Wide-use of advanced space techniques such as GPS and GLONASS in geodetic applications has even made Geoid determination a more important research field. The heights obtained with satellite measurements and conventional way are determined according to different reference surfaces. Ellipsoidal height can be determined with satellite measurements easily. However, in many geodetic applications instead of ellipsoidal heights, orthometric heights reckoned from Geoid are required. Because orthometric and ellipsoidal heights are determined according to different surfaces. These two height systems are not collided each other and the difference between the systems are called Geoid height or geoid undulation. Geoid undulation is a transformation parameter used between the two systems. If geoid height could be determined precisely, orthometric heights can be obtained from ellipsoidal heights easily. Therefore, instead of conventional way of levelling, heights can be obtained with GPS measurements by saving time and money.

Therefore, the study was carried out to improve EGM2008 Geoid undulation values to determine Quasi Geoid model to Sri Lanka.

Total of forty seven (47) Bench Marks were selected in Sri Lanka. Thirty seven (37) model points and ten (10) validation points were used to create a polynomial model. The polynomial model consisted of two inputs (latitude and longitude) and one output (Geoid undulation difference with EGM2008). Model calculations were performed using surface fitting toolbox in Matlab. Forty seven (47) model points were also used to determine significant polynomial coefficients for Sri Lanka. Third degree polynomial coefficient was used. Finally, Quasi Geoid undulation were examined according to the polynomial model.

In this research, it was found that, there were twenty (20) Bench Marks out of forty seven (47) Bench Mark locations were computed with accuracy of ±0.05 m, followed by eleven (11) locations with accuracy range between ±0.05 m to ±0.10 m, eight (8) locations with accuracy range between of ±0.10 m to ±0.15 m, three (3) locations with accuracy range between ±0.15 m to ±0.20 m and four (4) locations with accuracy range greater than 0.20 m. According to derived Quasi Geoid model the orthometric height can be computed.

Therefore, the results obtained from model data are quite satisfactory yielding proper accuracy required in the practical engineering applications that is defined as ± 5 cm in the regulations for Large Scale Mapping and Geospatial Data Production in Sri Lanka.