Wavelet Multi-Resolution Analysis for Refined Gravimetric Geoid Over Saudi Arabia

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Due to the inaccuracies and non-homogeneity in the gravity observations, computed gravimetric geoid over Saudi Arabia requires filtering. In this investigation, the Wavelet Multi-Resolution Analysis (WMRA) has been used to refine, decompose, analyze, and reconstruct the gravimetric geoid at different levels. By this approach, spatially correlated errors in the gravity observations can also be eliminated. We applied the WMRA to the computed gravimetric geoid, up to 3 levels of resolution, filtered out by using scaled white noise (SWN) filter. Our findings reveal that noise can be eliminated at level 2. The WMRA 2 with SWN shows that residuals after filtering are normally distributed with small standard deviation. The spatial distribution of the residuals have noise characteristics. The WMRA refined geoid is compared with GPS/Levelling-derived geoid and conclusions have been made about applicability of this technique.