

Inversion of Gravity Data for Density Reconstruction

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Abstract : Inverse problem generally used for recovering hidden information from outside available data. Vertical component of gravity field we will be going to use for underneath density structure calculation. Ill-posing nature is main obstacle for any inverse problem. Linear regularization using Tikhonov formulation are used for appropriate choice of SVD and GSVD components. For real time data handle, signal to noise ratios should have to be less for reliable solution. In our study, 2D and 3D synthetic model with rectangular grid are used for gravity field calculation and its corresponding inversion for density reconstruction. Fine grid also we have considered to hold any irregular structure. Keeping in mind of algebraic ambiguity factor number of observation point should be more than that of number of data point. Picard plot is represented here for choosing appropriate or main controlling Eigenvalues for a regularized solution. Another important study is depth resolution plot (DRP). DRP are generally used for studying how the inversion is influenced by regularizing or discretizing. Our further study involves real time gravity data inversion of Vredeforte Dome South Africa. We apply our method to this data. The results include density structure is in good agreement with known formation in that region, which puts an additional support of our method.

Keywords : depth resolution plot, gravity inversion, Picard plot, SVD, Tikhonov formulation

Conference Title : ICGS 2017 : International Conference on Geophysics and Seismology

Conference Location : Bangkok, Thailand

Conference Dates : August 30-31, 2017