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Aseel Titi* (titia@wit.edu). *A three dimensional inverse gravimetry problem with minimal data.*

The inverse problem in gravimetry is to find a domain D inside the reference domain Ω from measurements of gravitational force outside Ω . We considered the problem in three dimensions where we found that a few parameters of the unknown D can be stably determined given data noise in practical situations. An ellipsoid is the best approximation of D . We derived simple systems of linear and nonlinear algebraic equations for the parameters of the ellipsoid for one particular case. We used these equations to prove uniqueness of recovering an ellipsoid for the inverse problem from minimal amount of data which are the approximated gravitational force at nine boundary points. Similarly, a rectangular parallelepiped D is considered. To support our theory we used numerical examples with different location of measurement points on $\partial\Omega$. (Received January 16, 2022)