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Aseel Titi* (titi@math.wichita.edu). *On the 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 first considered the two-dimensional case where we found that about five parameters of the unknown D can be stably determined given data noise in practical situations. An ellipse is uniquely determined by five parameters. We proved uniqueness and stability of recovering an ellipse for the inverse problem from minimal amount of data which are the gravitational force at three boundary points. In the proofs we derived and used simple systems of linear and non linear algebraic equations for natural parameters of an ellipse. To illustrate the technique we used these equations in numerical examples with various location of measurements points on $\partial\Omega$. We also considered the problem in three dimensions where we proved uniqueness for an ellipsoid in some particular cases. The results are obtained jointly with professor Victor Isakov. (Received January 14, 2021)