

“Demystifying Least Square Adjustment Using Android Smartphone and Graphic Calculator”

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Abstract:

“Least Square Adjustment” is recommended as the best method for adjusting various surveying observations and computations used in map making. Its mathematical complexity and analysis remains however, a mystery to some students of Surveying, Cartography or Geoinformatics, who are not using high end, costly and branded soft wares. This paper therefore will attempt to demystify this epitome of survey adjustment by presenting a review of mathematical subjects like Matrix Arithmetic, Linear Algebra, Statistics and Differential Equations as foundation for understanding. Derived equations from this subjects and other learning materials is presented with complimentary explanation. Practical sample problems are solved using Casio Graphic Calculators programmed by the author and its results compared.. More advanced Least Square operations is introduced using “BIGLINE” an Android application for smartphones developed by the author. Programs developed were used to solve problems in Resection, Traverse and Coordinate Transformations. Comparative solutions present the same results against sample problems figured in books or published research papers. Challenges to its application and future developments will cap the discussion as well as its potential as a learning and practical problem solving tool necessary for a competent cartographer or GIS professional.

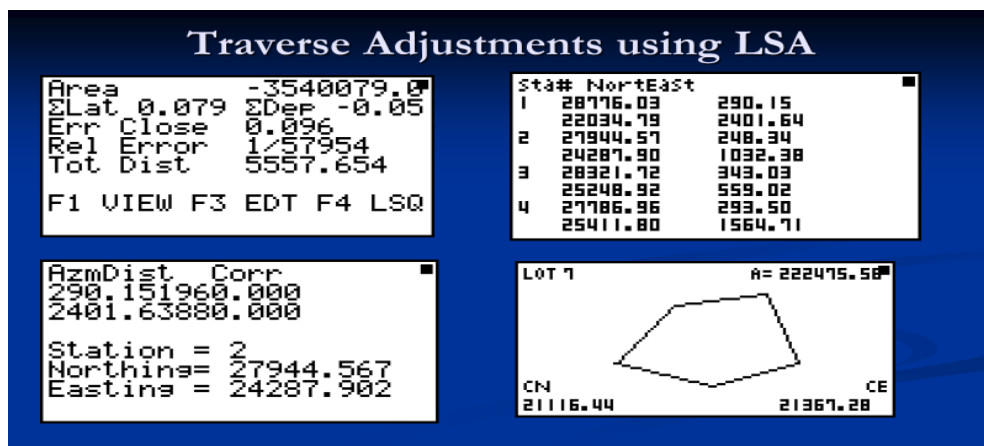


Fig. 1 Screenshots of Casio Graphic Calculator used in Traverse Computation Adjustment

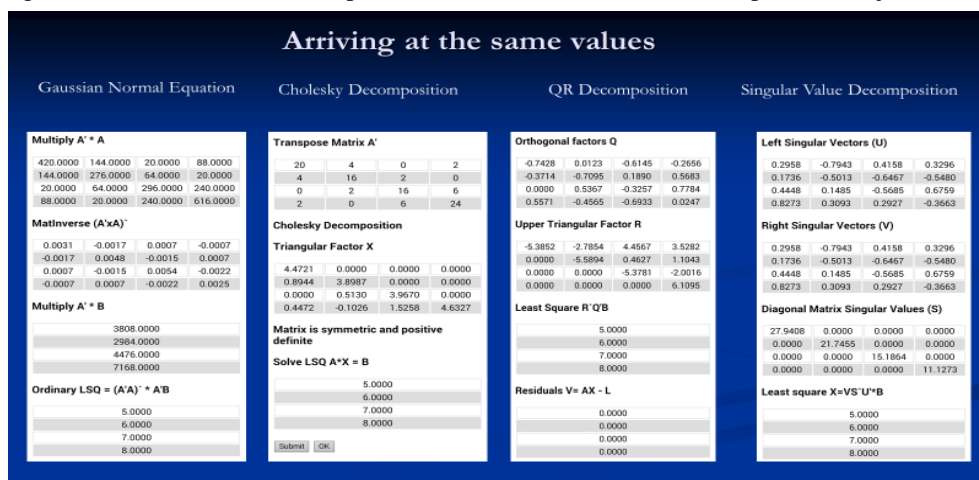


Fig. 2 Screenshots of Android Smartphone with various Least Square Computation Methods