ART and Downward Continuation

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There are various kinds of Regularization Methods to solve an Unstable Inverse Problem. There are some assumptions behind each Regularization Method which is imposed upon the Inverse Problem. Sometimes the assumptions differ from the Inverse Problem properties and sometimes the assumptions agree with the Inverse Problem properties, hence we see that often a Regularization method is successful in a problem and it is unsuccessful in another problem. The paper recommends ART (Algebraic Reconstruction Technique) based on geometrical reason, as Indirect Regularization Method. The authors believe that ART need not to impose any assumptions to the problem but ART employs the properties of the problem to solve it. ART is founded on a characteristic of Linear Inverse Problems which is that each Linear Inverse Problem comprises intersection of some Hyper Planes. Thus ART step by step finds the solution in these hyper planes and at last it prepares a sequence of the solutions which semi-Converges on exact solution. In this paper, the authors prepare a simulated inverse problem same as a real inverse problem which is achieved in Downward Continuation based on Inversion of Abel-Poisson Integral Equation. So in the simulation, ART is compared with some other regularization methods such as some Direct Methods ((ordinary and Generalied) Tikhonov, Truncated SVD and Truncated GSVD) and some Indirect Methods (Landweber-Fridman, Iterated Tikhonov, Krylov Subspace Methods (CG, LSQR)). The results agreed with the author's belief, Hence they utilized ART to stabilize the real Unstable Problem of Downward Continuation for Geoid Computation in geographical region of Iran.