



Inverse theory: from least squares optimization to Monte Carlo sampling

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The classical, optimization approach to seismic inversion relies on the searching for the model the best fitting to data under optional additional condition (smoothness, limited variability range, etc.). This approach provides many valuable information on earth or rock samples structures, seismic rupture process, etc. . However, this technique fails to estimate reasonable enough an accuracy of the found images. Moreover, a necessity of the ad hoc regularization rises the question if all observational and prior data are used in the optimum way. The promising extension of the classical inversion technique which can address the above issues is the method which uses Monte Carlo techniques to sample the model space in searching not only for the optimum model but also exploring its "neighborhood". This way it provides the framework for the statistical analysis of the imaging accuracy and systematic studies other important tomography issues.

In this contribution we present the basic ideas of the Monte Carlo based inversion technique. The approach is illustrated by results of local velocity tomography and kinematic source tomography.