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**VLADIMIR ZUBOV**, University of Calgary

*Mesh refining in data preprocessing for the seismic inversion problem*

Seismic inversion is a complex wave equation coefficients problem. Modern geophysical equipment provides researchers with high resolution images and seismograms which makes the wave data inversion more and more challenging. For acoustic waveform inversion standard gradient methods much easier convergences to approximate solutions on the coarse grid than on fine one. It gives geometrical multigrid method a chance to speed up the convergence and to optimize expenses on processing seismograms building the initial approximation of the velocity field. Just one iteration of multigrid with standard gradient method can be enough to prepare adequate approximation of the solution.

One of the main ingredients of multigrid are scaling of misfit function from grid to grid and solving a coarse problem. Local smoothing during the scaling is especially efficient in case of limited computational resources. On the other hand, in this situation the convergence of gradient method even more depends on the smoothness of the exact solution of the synthetic data.