

## Time-reversal - an efficient method for Bayesian inversion

Wojciech Debski

Institute of Geophysics PAS, Dept. of Theoretical Geophys., Warsaw, Poland (debski@igf.edu.pl)

Probabilistic, often also called Bayesian inversion technique is superior to the classical optimization-based approach in all but one aspects. It requires quite exhaustive computations which prohibit its use in huge size inverse problems like global seismic tomography or waveform inversion to name a few. The advantage of the approach are, however, so appealing that there is an ongoing continuous effort to make the huge inverse task manageable with the probabilistic inverse approach. One of the possibilities to achieve this goal described in this contribution is to explore the internal symmetry of the seismological modelling problems in hand – a time reversal and reciprocity invariance. These two basic properties of the elastic wave equation when incorporated into the probabilistic inversion schemata open new horizons for Bayesian inversion. In this presentation we discuss the time reversal symmetry property and discuss how to combine it with the probabilistic inverse theory.

We illustrate this with the newly developed location algorithm TRMLOC and discuss its efficiency when applied to mining induced seismic data.