## Deterministic and Probabilistic Methods for Seismic Source Inversion

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## Abstract

The national Earthquake Information Center (NEIC) reports an occurrence of about 13,000 earthquakes every year, spanning different values on the Richter scale from very mild (2) to "giant earthquakes" (8 and above). Being able to study these earthquakes provides useful information for a wide range of applications in geophysics. In the presented work we study the characteristics of an earthquake by performing seismic source inversion; a mathematical problem that, given some recorded data, produces a set of parameters that when used as input in a mathematical model for the earthquake produce synthetically generated data that closely resembles the measured data. There are two approaches to performing this source inversion: a deterministic and a probabilistic approach. We present an overview of both methods as well as implementing different seismic source inversion experiments for recorded waveforms in one and two dimensions.