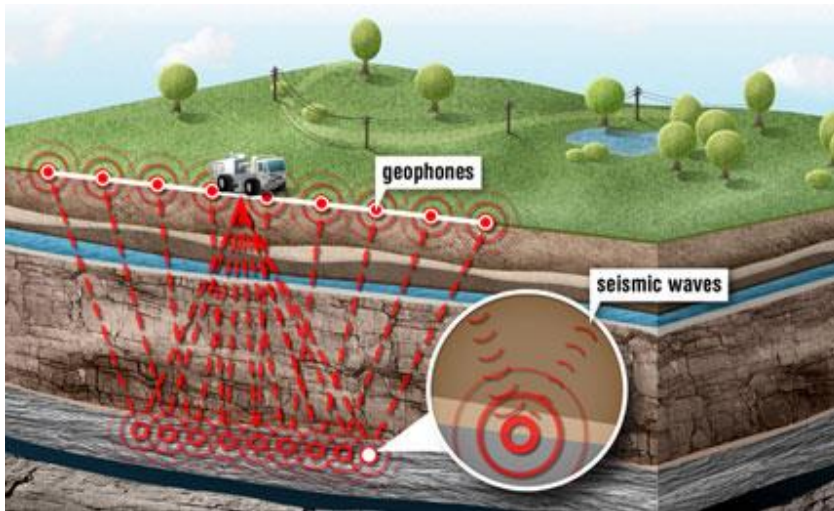


The adjoint method for localizing soil perturbations



Assume you want to find oil ...
... but you have no detailed information about the earth's interior.

All you have are:

- some seismic recordings
- a computer
- interest in solving PDEs numerically
- good programming skills

Seismic technologies in oil and gas exploration – earthsky.org

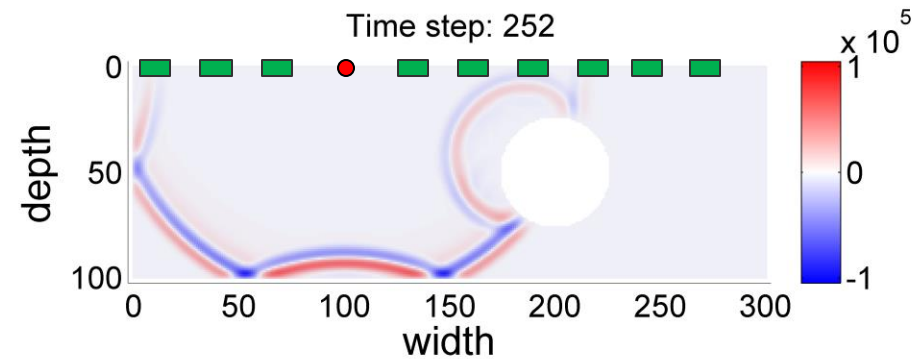
The adjoint method for localizing soil perturbations

Find the oil and

- Understand the governing equations of acoustics
- Implement different finite-difference schemes to solve the wave equation using MATLAB
- Understand and implement the concept of *Time Reversal*
- Use the *continuous adjoint state method* to locate all model perturbations

Project Characteristics

Modeling: ★★☆☆☆
 Mathematics: ★★★★★
 Programming: ★★★★★



Simulation of acoustic wave propagation; (●) source location; Waves are reflected at a cavity and later recorded at (■).