Seismic Modeling

Chris Vogl

Applied Mathematics Department
Motivation: Earthquake Generated Tsunamis

- Land mass is added to the Juan de Fuca plate at the ridge
- This pushes the Juan de Fuca plate under the North American plate.
- The locking and unlocking of these plates generate various types of earthquakes
- Subduction zone quakes occur under the ocean floor and generate tsunamis
Modeling the Sea Surface Deformation

• Geoclaw accomplishes (1) using the Okada solution, which assumes homogeneous half-space
  • What about variable density ground layers?
  • What happen when bathymetry is incorporated?
  • Do time dependent effects matter?

• Geoclaw accomplishes (2) assuming instantaneous motion of water column
  • Do time dependent effects matter?
Current Work and Needs

• SeisClaw? SiesmoClaw? RumbleClaw?
  - Currently have 2D examples to look at seafloor deformation and sea surface deformation
  - Almost completed 3D example to look at seafloor deformation

• Current Needs
  - Coupling output to Geoclaw's initial condition
  - 3D visualization work to view results