

3-D Seismic Imaging

Geophysics 280 – MWF 10:00 – 10:50

3 units with labs: 35% final, 35% quizzes, 30% labs - Letter grade or instructor consent for CR/NC

2 units without labs: 50% final, 50% quizzes - Letter grade or CR/NC

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Lecture Schedule

- 4/1 Introduction (Introduction)
- Lab 1 online
- 4/3 3D Geometries (Chapter 1)
- 4/5 Sep3D software (Appendix 1)

- 4/8 Kirchhoff prestack migration (Chapter 2)
- 4/10 Kirchhoff prestack migration (isotropy vs anisotropy) class handout
- Lab 1 due; Lab 2 online
- 4/12 NMO+DMO+AMO and prestack partial migration (Chapter 3)

- 4/15 Wavefield-continuation migration (Chapter 4)
- 4/17 Numerical methods for wavefield-continuation - two way wave equation Notes
- 4/19 Numerical methods for downward continuation - one way wave equation (Chapter 5)
- Lab 2 due; Lab 3 online

- 4/22 Numerical methods for downward continuation (isotropic and anisotropic) (Chapter 5 + Notes)
- 4/24 Wavefield-continuation migration as adjoint of wavefield modeling (Notes)
- 4/26 Common image gathers in offsets and angles (Chapter 6)

- 4/29 Gaussian Beam migration (Chapter 6)
- 5/1 Plane-wave and phase encoding migration (Chapter 7)
- Lab 3 due; Lab 4 online
- 5/3 Plane-wave and phase encoding migration (Chapter 7)

- 5/6 3D marine wave-equation migration methods (Chapter 7)
- 5/8 Imaging and aliasing (Elita teaches) (Chapter 8)
- 5/10 Imaging and irregular geometries (Chapter 9)

- 5/13 Imaging and irregular illumination + linearized Inversion (Chapter 9)
- 5/15 Linearized inversion and least-squares reverse time migration (Notes)
- Lab 4 due; Lab 5 online
- 5/17 Stacking velocity, Dix inversion, and travelttime tomography (Chapter 10)
- 5/20 Inversion of stacking velocities (Chapter 10) and time migration velocity analysis (Chapter 11)
- 5/22 Residual moveout analysis and residual migration (Chapter 11)
- 5/24 Vertical and tomographic velocity updating (Chapter 11)
- Lab 5 due; Lab 6 online
- 5/27 Memorial Day, No class
- 5/29 Tomographic velocity updating (Chapter 11)
- 5/31 Wave equation migration velocity analysis (Chapter 12)
- 6/3 Principles of full-waveform inversion and its limitation (notes)
- Lab 6 due
- 6/5 Review and Q&A