

Projects

In pairs, you should pick one of the following chapters¹, study it, fill in details and produce a writeup. You should take the opportunity to explore nearby directions of interest. At the end of the course and your partner, you will present on your findings via a thirty minute blackboard presentation.

1. Chapter 4: The Dirichlet Integral and the Laplace Operator
2. Chapter 5,6: Snell's Law of Refraction, Water Depth and Cartesian Science
3. Chapter 7,8,9: Rainbows
4. Chapter 12: Rotation of a Liquid
5. Chapter 24: Mean Frequency of Explosions (according to Ya. B. Zel'dovich) and de Sitter's World
6. Chapter 27: Lidov's Moon Landing Problem
7. Chapter 28: Journey to the Center of the Earth
8. Chapter 34: The mathematical notion of potential
9. Chapter 36: Adiabatic Invariants
10. Chapter 39: Rotation of Rigid Bodies and Hydrodynamics

Arnol'd, V. I. (2014). Mathematical understanding of nature: essays on amazing physical phenomena and their understanding by mathematicians. American Mathematical Soc..

¹Actually, you should be happy to do a few. Specific chapter assignments will be determined in class.