

Mathematics 116

Convexity and Optimization with Applications

Assignment VIII	Due in class on May 12
Announcements	<p>No lecture on Thursday, May 5. Class will meet next week on May 10 and 12 as usual for wrap up and review sessions.</p> <p>Projects will be accepted until May 19 in the Math 116 folder in the wooden mailbox that says Goroff outside SC 325. The final is scheduled for Monday, May 23, at 2:00.</p>
Reading	Chapter 7 and Chapter 8 of OVSM. Chapter 9 lightly, too.
Exercises	<p>Do three of these from OVSM §7.14: #17, 19, 20, 21.</p> <p>Do four of these from OVSM §8.8: #7, 8, 9, 10, 14.</p> <p>Note: These are not all easy, but as suggested on the syllabus, a few of them or problems just like them may turn up on the final.</p>
Writing	Talk about and post your ideas for a project based on the handout. Also, the online CUE course evaluations are very important to me. See https://evaluations.fas.harvard.edu/cue/survey.cgi to do yours.
Discussion	<p>Why might an economist say that prices live in the dual of the space of commodity quantities? Interpret the conjugate $c^*(x^*)$ when $c(x)$ is the cost of producing a quantity x. Compare the “Sensitivity” results in §8.5 of OVSM with what economists call the “Envelop Theorem” says about “shadow prices.”</p> <p>What does Fenchel Duality have to do with the Legendre Transformation in classical mechanics? Show that you can go from the Lagrangian to Hamiltonian formulations of mechanics by thinking about dual problems in this way.</p> <p>Work through some of the details suggested in class about how the duality of linear programs can be viewed as a special case of Fenchel Duality and the Minimax Theorem of Game Theory, too.</p>