

Optimisation 1, Lecture 25

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Previous lecture

- Strong duality for convex problems:
 - ▶ Assume that f is convex, that the equality constraints are linear, and the inequality constraints are linear or concave.
 - ▶ Assume that Slater's constraint qualification holds and that the primal problem has a solution.
 - ▶ Then the dual problem has a solution and the duality gap is zero.
 - ▶ If x^* is a primal solution and λ^* is a dual solution, then (x^*, λ^*) is a saddle point, and λ^* is a Lagrange parameter for x^* .
- Application to elastic net regression — dual projected gradient ascent method for non-smooth problems:
 - ▶ The dual problem is a quadratic optimisation problem with convex constraints.
 - ▶ The primal solution can be recovered from the dual solution by solving a linear system.

Goals for today's lecture

- Duality for linear programmes.
- Idea of interior point methods.
- Long-step primal-dual interior point method for linear programmes.

Plan for rest of the term

- Monday, April 24: Last lecture — summary of the course.
- Friday, May 5, 14:15–?? in EL1: question session.
 - ▶ Please bring questions! (Or send them to me in advance.)
- Tuesday, May 09, 15:00–19:00: Exam.
 - ▶ Formula sheet is on the wiki page.
- I still have regular office hours on April 25 and May 02 from 10–11.
- Feel free to post questions in the digital mattelab.