

## Homework #4

CS 169/268 Optimization

Fall 2023

Due: Thursday November 16 11:59pm on Canvas

Reading:

*Undergrads:*

Kochenderfer and Wheeler:

Chapter 10;

Chapter 8 Sections 8.1, 8.3, 8.5; Chapter 9 Section 9.1-9.4 (for project ideas).

Also (optionally but if at all possible) Belegundu and Chandrupatla:

Chapter 5 Sections 5.1-5.6, 5.9; optionally 5.12 for SQP;

Chapter 6 Sections 6.1-6.6;

Chapter 7: 7.7-7.9 (for project ideas)

*Grads:*

Kochenderfer and Wheeler:

Chapters 8-10;

Also (optionally but if at all possible) Belegundu and Chandrupatla (3rd ed.):

Chapters 5,6; (B&C Chapter 7 was already assigned in HW 3)

Also Bertsekas Chapter 3 Sections 3.1-3.3, 3.7-3.8; Chapter 4 Sections 4.1-4.3.2

(can skip 4.2.3); also 4.4; 5.1-5.2.2; 5.4.1.

Note: This source is substantially more advanced.

*Just do your best in reading it!*

Also for advanced projects methods please have a look at these, on Canvas:

Boyd et al. on ADMM (Sections 2, 3, and 7 at least)

*Everyone:*

Browse the class Canvas site code links and resources, in preparation for projects.

Recall the Homework Ground Rules in HW0, point #1. In accordance with those rules, ...

Problem 1: (undergrads and grads) *Test* a gradient-based constrained optimization method (e.g. augmented Lagrangian KW10.8/BC6.6, Rosen's gradient projection BC5.9 (cf. Bertsekas 3.3.1), interior point KW10.9/BC6.3-6.4, or sequential quadratic programming BC5.12) on a constrained optimization problem of your choice with ten or more variables, in the manner of HW2, Problem 1c. *Explore* numerically, and *report*, as usual.

Problem 2: (grads only - extra credit up to 10% for undergrads) *Test* a stochastic direct search unconstrained optimization method of your choice on a problem of your choice with ten or more variables, in the manner of HW2, Problem 1c. *Explore* numerically, and *report*, as usual.