

Homework 1

Interior Point Methods

1:

Consider the LP problem

$$\begin{array}{ll} \min & x_1 + x_2 \\ \text{subject to} & x_1 + x_2 + x_3 = 1, \\ & (x_1, x_2, x_3) \geq 0. \end{array}$$

- a) What is the analytic center of the feasible region?
- b) Find the central path point $\mathbf{x}(\mu) = (x_1(\mu), x_2(\mu), x_3(\mu))$.
- c) Show that as μ decreases to 0, $\mathbf{x}(\mu)$ converges to the unique optimal solution.
- d) Let the objective function be just minimizing x_1 . Then, find the central path point $\mathbf{x}(\mu)$ again. Which point does the central path converge to now?

2: Exercise 3 and 5, chapter 2 of Wright's book.