

# Reading Seminar: Interior Point Methods

## Preliminaries:

1. **chapter 1** (recall some important concepts and theorems, fix notation for upcoming talks)

## Basic Interior Point Method Theory:

2. **section 2.1** “Intrinsic inner products” and **subsection 2.2.1** “Self-Concordant Functionals: Introduction”; then compare to other definitions of self-concordance (see **section 2.5** “Matters of Definition”)
3. **subsection 2.2.2** “Self-Concordancy and Newton’s Method” and **subsection 2.2.3** “Other Properties”
4. **subsections 2.3.1 – 2.3.4** on “Barrier Functionals” (subsection 2.3.5 “Logarithmic Homogeneity” will come later)
5. **subsection 2.4.1** “Primal Algorithms: Introduction” and **subsection 2.4.2** “The Barrier Method”
6. **subsection 2.4.3** “The Long-Step Barrier Method” and **subsection 2.4.4** “A Predictor-Corrector Method”

## Conic Programming and Duality:

7. **section 3.1** “Conic Programming” and **subsection 2.3.5** “Logarithmic Homogeneity”
8. **section 3.2** “Classical Duality Theory”
9. **section 3.3** “The Conjugate Functional”
10. **section 3.4** “Duality of the Central Paths”, **subsection 3.5.1** “Self-Scaled Cones: Introduction” and **subsection 3.5.2** “Important Remark on Notation”
11. **subsections 2.5.3** “Scaling Points” and **subsection 2.5.4** “Gradients and Norms”
12. **subsection 2.5.5** “A Useful Theorem” and **section 3.6** “The Nesterov-Todd Directions”
13. **section 3.7** “Primal-Dual Path-Following Methods”
14. **section 3.8** “A Primal-Dual Potential-Reduction Method”