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Week 7

1 Brief Discussion

1.1 Subgradients

2 Examples

Example 2.1. [1], exercise 5.10.

Example 2.2. [1], exercise 5.15(a),(b).

Example 2.3. (Taken from [2], chapter 7). Consider the parametric cost LP:

$$\begin{aligned} \text{minimize} \quad & (\boldsymbol{c} + \lambda \boldsymbol{c}^\star)^T \boldsymbol{x} \\ \text{subject to} \quad & \boldsymbol{A}\boldsymbol{x} = \boldsymbol{b} \\ & \boldsymbol{x} \geq \boldsymbol{0}. \end{aligned}$$

If the objective value is known to be unbounded below for some value $\lambda = \lambda_0$, prove that the objective value is unbounded below for λ in at least one of the intervals $(-\infty, \lambda_0]$ or $[\lambda_0, \infty)$.

Example 2.4. [1], exercise 6.5.

Example 2.5. [1], exercise 6.8.

References

[1] Bertsimas, D.; Tsitsiklis, J.N. *Introduction to Linear Optimization.* Athena Scientific, 1997.

[2] Murty, K.G. *Linear and Combinatorial Programming.* John Wiley & Sons, 1976.