

# 6.251/15.081J Recitation 7

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## 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:

$$\begin{array}{ll} \text{minimize} & (\mathbf{c} + \lambda \mathbf{c}^*)^T \mathbf{x} \\ \text{subject to} & \mathbf{A}\mathbf{x} = \mathbf{b} \\ & \mathbf{x} \geq \mathbf{0}. \end{array}$$

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  $\lambda$  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.