CS 6505 - Homework 10 - Worked with Qiaomei Li

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We define our variables: C_e = cost of the edge $e \in E$, X_e denotes whether e is in the arborescence or not, A some subset of the nodes $\subseteq V \setminus \{r\}$, A^+ = the set of edges leaving A. Our LP is to minimize $\sum_{e \in E} C_e X_e$ subject to $X_f \geq 1$ for all $f \in A^+$ and $X_e \geq 0$. The dual is to maximize $\sum yA$ subject to $\sum_{A|e \in A^+} yA \leq C_e$ for all edges e and $y_A \geq 0$. If the optimal solution to the dual program is OPT, then the minimum arborescence has cost at least OPT.