4-1: 线性规划 [课前]

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请独立完成作业,不得抄袭。 若参考了其它资料,请给出引用。 鼓励讨论,但需独立书写解题过程。

第一部分 作业

☑ Problem 1 (TC 29.1-4)

Convert the following linear program into standard form: minimize

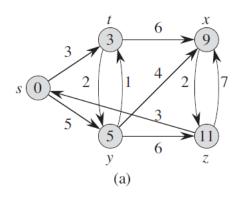
$$2x_1 + 7x_2 + x_3$$

subject to

Solution

☑ Problem 2 (TC 29.2-2)

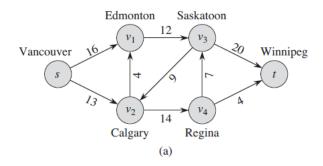
Write out explicitly the linear program corresponding to finding the shortest path from node s to node y in Figure 24.2(a).



Solution

☑ Problem 3 (TC 29.2-4)

Write out explicitly the linear program corresponding to finding the maximum flow in Figure 26.1(a).



Solution

☑ Problem 4 (TC 29.2-6)

Write a linear program that, given a bipartite graph G=(V,E), solves the maximum-bipartite-matching problem.

Solution

☑ Problem 5 (TC 29.3-5)

Solve the following linear program using Simplex: maximize

$$18x_1 + 12.5x_2$$

subject to

$$\begin{array}{cccc}
x_1 & + & x_2 & \leqslant & 20 \\
x_1 & & & \leqslant & 12 \\
& & x_2 & \leqslant & 16 \\
x_1, & & x_2 & \geqslant & 0
\end{array}$$

Solution

☑ Problem 6 (TC 29.4-2)

Suppose that we have a linear program that is not in standard form. We could produce the dual by first converting it to standard form, and then taking the dual. It would be more convenient, however, to be able to produce the dual directly. Explain how we can directly take the dual of an arbitrary linear program.

Solution