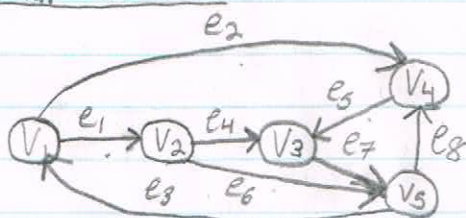


MATH 3802 Tutorial #2:

Tutorial Solutions:

①



$$b = [2, 2, -5, 0, -1]$$

$$c = [0 \ 2 \ 1 \ 2 \ 2 \ 0 \ 2]$$

$$x^* = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 2 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

②

$$T = \{e_2, e_4, e_5, e_6\} \text{ \& } N = \{e_1, e_3, e_7, e_8\} \text{ \& } N = A \setminus T$$

$$y_n \Rightarrow y_5 = 0$$

$$e_6: y_5 - y_2 = 2 \Rightarrow 0 - y_2 = 2 \Rightarrow y_2 = -2$$

$$e_4: y_3 - y_2 = 2 \Rightarrow y_3 = 2$$

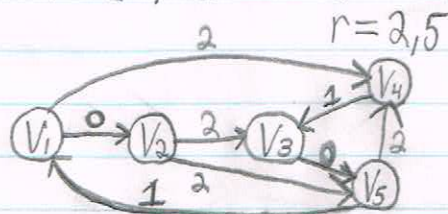
$$e_5: y_3 - y_4 = 1 \Rightarrow y_4 = 1$$

$$e_2: y_4 - y_1 = 2 \Rightarrow y_1 = -1$$

$$e_1: y_1 - y_2 = -1 - (-2) = 1 > 0 = c_1$$

Add e_1 & form a cycle:

$$R = \{e_2, e_5\} \Rightarrow \theta = \min[2, 2] = 2$$



Practice Solutions:

① ASK for a feasible tree solution determined by a tree with arc-sets containing e_1 & e_6 :

$$T = \{e_1, e_6\} \text{ connecting } V_1, V_6$$

to connect the others, we have:

$$e_2 + e_5 \text{ OR } e_2 + e_4 \text{ OR } e_8 + e_4, \text{ thus } e_2 + e_5 \text{ is optimal}$$

$$x^* = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

thus choose paths $\{e_1, e_2, e_5, e_6\}$

② Another iteration with new Soln:

$$y_n = y_5 = 0$$

$$e_6: y_2 - y_5 = 2 \Rightarrow 0 - y_2 = 2 \Rightarrow y_2 = -2$$

$$e_1: y_1 - y_2 = 0 \Rightarrow 0 - y_1 = 0 \Rightarrow y_1 = 0$$

$$e_2: y_1 - y_4 = 2 \Rightarrow 0 - y_4 = 2 \text{ thus } y_4 = -2$$

$$e_5: y_4 - y_3 = 1 \Rightarrow -2 - y_3 = 1 \text{ thus } y_3 = -3$$

$$e_4: y_2 - y_3 = 2 \Rightarrow -2 - (-3) = 1 > 2 = c_4 \text{ So add } e_4 \text{ to form a cycle}$$

$$R = \{e_2, e_5\} \Rightarrow \theta = \min[2, 2] = 2; r = 2.5$$

$$\text{new } x^* = [0 \ 0 \ 0 \ 0 \ 2 \ 0 \ 0]; r = 2$$

$$\text{New } T = \{e_1, e_4, e_5, e_6\}$$

\hookrightarrow dropped e_2