

Read in the following dictionary:

x_9	10.0	$+3.00x_1 - 6.00x_2 + 9.00x_3 - 3.00x_4 - 4.00x_5 + 3.00x_6 - 5.00x_7 + 6.00x_8$
x_{10}	6.0	$+8.00x_1 + 2.00x_2 + 7.00x_3 - 1.00x_4 - 9.00x_5 - 1.00x_7 - 5.00x_8$
x_{11}	4.0	$+9.00x_1 + 4.00x_2 - 7.00x_3 - 2.00x_4 - 6.00x_5 - 1.00x_6 + 9.00x_7 + 5.00x_8$
x_{12}	16.0	$-6.00x_1 + 8.00x_2 - 2.00x_3 - 7.00x_4 + 10.00x_5 + 1.00x_6 + 7.00x_7 - 9.00x_8$
x_{13}	-3.0	$-4.00x_1 - 8.00x_2 + 9.00x_3 + 4.00x_4 + 3.00x_5 + 10.00x_6 + 5.00x_7 - 8.00x_8$
z	0.0	$+1.00x_1 - 1.00x_2 - 5.00x_3 - 2.00x_4 - 3.00x_5 - 3.00x_6 - 3.00x_8$

0.1 Initialization Phase: Dual Problem Solving

New Objective in primal was changed to :

$$\max \sum_{j=1}^8 -x_j$$

Primal variable x_j corresponds to dual variable y_j for $j = 1, \dots, 13$ Dual Dictionary (with objective changed is):

y_1	1.0	$-3.00y_9 - 8.00y_{10} - 9.00y_{11} + 6.00y_{12} + 4.00y_{13}$
y_2	1.0	$+6.00y_9 - 2.00y_{10} - 4.00y_{11} - 8.00y_{12} + 8.00y_{13}$
y_3	1.0	$-9.00y_9 - 7.00y_{10} + 7.00y_{11} + 2.00y_{12} - 9.00y_{13}$
y_4	1.0	$+3.00y_9 + 1.00y_{10} + 2.00y_{11} + 7.00y_{12} - 4.00y_{13}$
y_5	1.0	$+4.00y_9 + 9.00y_{10} + 6.00y_{11} - 10.00y_{12} - 3.00y_{13}$
y_6	1.0	$-3.00y_9 + 1.00y_{11} - 1.00y_{12} - 10.00y_{13}$
y_7	1.0	$+5.00y_9 + 1.00y_{10} - 9.00y_{11} - 7.00y_{12} - 5.00y_{13}$
y_8	1.0	$-6.00y_9 + 5.00y_{10} - 5.00y_{11} + 9.00y_{12} + 8.00y_{13}$
z	-0	$-10.00y_9 - 6.00y_{10} - 4.00y_{11} - 16.00y_{12} + 3.00y_{13}$

Initialization succeeded in finding final dual dictionary with 2 pivots

y_1	1.4	$-4.20y_9 - 8.00y_{10} - 8.60y_{11} + 5.60y_{12} - 0.40y_6$
y_2	1.8	$+3.60y_9 - 2.00y_{10} - 3.20y_{11} - 8.80y_{12} - 0.80y_6$
y_3	0.1	$-6.30y_9 - 7.00y_{10} + 6.10y_{11} + 2.90y_{12} + 0.90y_6$
y_4	0.6	$+4.20y_9 + 1.00y_{10} + 1.60y_{11} + 7.40y_{12} + 0.40y_6$
y_5	0.7	$+4.90y_9 + 9.00y_{10} + 5.70y_{11} - 9.70y_{12} + 0.30y_6$
y_{13}	0.1	$-0.30y_9 + 0.10y_{11} - 0.10y_{12} - 0.10y_6$
y_7	0.5	$+6.50y_9 + 1.00y_{10} - 9.50y_{11} - 6.50y_{12} + 0.50y_6$
y_8	1.8	$-8.40y_9 + 5.00y_{10} - 4.20y_{11} + 8.20y_{12} - 0.80y_6$
z	0.3	$-10.90y_9 - 6.00y_{10} - 3.70y_{11} - 16.30y_{12} - 0.30y_6$

Primal Dictionary is:

x_9	10.9	$+4.20x_1 - 3.60x_2 + 6.30x_3 - 4.20x_4 - 4.90x_5 + 0.30x_{13} - 6.50x_7 + 8.40x_8$
x_{10}	6.0	$+8.00x_1 + 2.00x_2 + 7.00x_3 - 1.00x_4 - 9.00x_5 - 1.00x_7 - 5.00x_8$
x_{11}	3.7	$+8.60x_1 + 3.20x_2 - 6.10x_3 - 1.60x_4 - 5.70x_5 - 0.10x_{13} + 9.50x_7 + 4.20x_8$
x_{12}	16.3	$-5.60x_1 + 8.80x_2 - 2.90x_3 - 7.40x_4 + 9.70x_5 + 0.10x_{13} + 6.50x_7 - 8.20x_8$
x_6	0.3	$+0.40x_1 + 0.80x_2 - 0.90x_3 - 0.40x_4 - 0.30x_5 + 0.10x_{13} - 0.50x_7 + 0.80x_8$
z	-0.3	$-1.40x_1 - 1.80x_2 - 0.10x_3 - 0.60x_4 - 0.70x_5 - 0.10x_{13} - 0.50x_7 - 1.80x_8$

Primal Dictionary with original objective is:

x_9	10.9	$+4.20x_1 - 3.60x_2 + 6.30x_3 - 4.20x_4 - 4.90x_5 + 0.30x_{13} - 6.50x_7 + 8.40x_8$
x_{10}	6.0	$+8.00x_1 + 2.00x_2 + 7.00x_3 - 1.00x_4 - 9.00x_5 - 1.00x_7 - 5.00x_8$
x_{11}	3.7	$+8.60x_1 + 3.20x_2 - 6.10x_3 - 1.60x_4 - 5.70x_5 - 0.10x_{13} + 9.50x_7 + 4.20x_8$
x_{12}	16.3	$-5.60x_1 + 8.80x_2 - 2.90x_3 - 7.40x_4 + 9.70x_5 + 0.10x_{13} + 6.50x_7 - 8.20x_8$
x_6	0.3	$+0.40x_1 + 0.80x_2 - 0.90x_3 - 0.40x_4 - 0.30x_5 + 0.10x_{13} - 0.50x_7 + 0.80x_8$
z	-0.9	$-0.20x_1 - 3.40x_2 - 2.30x_3 - 0.80x_4 - 2.10x_5 - 0.30x_{13} + 1.50x_7 - 5.40x_8$

1 Optimization Phase Simplex

Starting Dictionary is:

x_9	10.9	$+4.20x_1 - 3.60x_2 + 6.30x_3 - 4.20x_4 - 4.90x_5 + 0.30x_{13} - 6.50x_7 + 8.40x_8$
x_{10}	6.0	$+8.00x_1 + 2.00x_2 + 7.00x_3 - 1.00x_4 - 9.00x_5 - 1.00x_7 - 5.00x_8$
x_{11}	3.7	$+8.60x_1 + 3.20x_2 - 6.10x_3 - 1.60x_4 - 5.70x_5 - 0.10x_{13} + 9.50x_7 + 4.20x_8$
x_{12}	16.3	$-5.60x_1 + 8.80x_2 - 2.90x_3 - 7.40x_4 + 9.70x_5 + 0.10x_{13} + 6.50x_7 - 8.20x_8$
x_6	0.3	$+0.40x_1 + 0.80x_2 - 0.90x_3 - 0.40x_4 - 0.30x_5 + 0.10x_{13} - 0.50x_7 + 0.80x_8$
z	-0.9	$-0.20x_1 - 3.40x_2 - 2.30x_3 - 0.80x_4 - 2.10x_5 - 0.30x_{13} + 1.50x_7 - 5.40x_8$

x_7 enters and x_6 leaves

x_9	7.0	$-1.00x_1 - 14.00x_2 + 18.00x_3 + 1.00x_4 - 1.00x_5 - 1.00x_{13} + 13.00x_6 - 2.00x_8$
x_{10}	5.4	$+7.20x_1 + 0.40x_2 + 8.80x_3 - 0.20x_4 - 8.40x_5 - 0.20x_{13} + 2.00x_6 - 6.60x_8$
x_{11}	9.4	$+16.20x_1 + 18.40x_2 - 23.20x_3 - 9.20x_4 - 11.40x_5 + 1.80x_{13} - 19.00x_6 + 19.40x_8$
x_{12}	20.2	$-0.40x_1 + 19.20x_2 - 14.60x_3 - 12.60x_4 + 5.80x_5 + 1.40x_{13} - 13.00x_6 + 2.20x_8$
x_7	0.6	$+0.80x_1 + 1.60x_2 - 1.80x_3 - 0.80x_4 - 0.60x_5 + 0.20x_{13} - 2.00x_6 + 1.60x_8$
z	0.0	$+1.00x_1 - 1.00x_2 - 5.00x_3 - 2.00x_4 - 3.00x_5 - 3.00x_6 - 3.00x_8$

x_1 enters and x_9 leaves

x_1	7.0	$-1.00x_9 - 14.00x_2 + 18.00x_3 + 1.00x_4 - 1.00x_5 - 1.00x_{13} + 13.00x_6 - 2.00x_8$
x_{10}	55.8	$-7.20x_9 - 100.40x_2 + 138.40x_3 + 7.00x_4 - 15.60x_5 - 7.40x_{13} + 95.60x_6 - 21.00x_8$
x_{11}	122.8	$-16.20x_9 - 208.40x_2 + 268.40x_3 + 7.00x_4 - 27.60x_5 - 14.40x_{13} + 191.60x_6 - 13.00x_8$
x_{12}	17.4	$+0.40x_9 + 24.80x_2 - 21.80x_3 - 13.00x_4 + 6.20x_5 + 1.80x_{13} - 18.20x_6 + 3.00x_8$
x_7	6.2	$-0.80x_9 - 9.60x_2 + 12.60x_3 - 1.40x_5 - 0.60x_{13} + 8.40x_6$
z	7.0	$-1.00x_9 - 15.00x_2 + 13.00x_3 - 1.00x_4 - 4.00x_5 - 1.00x_{13} + 10.00x_6 - 5.00x_8$

x_3 enters and x_{12} leaves

x_1	21.3669724771	$-0.67x_9 + 6.48x_2 - 0.83x_{12} - 9.73x_4 + 4.12x_5 + 0.49x_{13} - 2.03x_6 + 0.48x_8$
x_{10}	166.266055046	$-4.66x_9 + 57.05x_2 - 6.35x_{12} - 75.53x_4 + 23.76x_5 + 4.03x_{13} - 19.94x_6 - 1.95x_8$
x_{11}	337.027522936	$-11.28x_9 + 96.94x_2 - 12.31x_{12} - 153.06x_4 + 48.73x_5 + 7.76x_{13} - 32.48x_6 + 23.94x_8$
x_3	0.798165137615	$+0.02x_9 + 1.14x_2 - 0.05x_{12} - 0.60x_4 + 0.28x_5 + 0.08x_{13} - 0.83x_6 + 0.14x_8$
x_7	16.2568807339	$-0.57x_9 + 4.73x_2 - 0.58x_{12} - 7.51x_4 + 2.18x_5 + 0.44x_{13} - 2.12x_6 + 1.73x_8$
z	17.376146789	$-0.76x_9 - 0.21x_2 - 0.60x_{12} - 8.75x_4 - 0.30x_5 + 0.07x_{13} - 0.85x_6 - 3.21x_8$

x_{13} enters and Unbounded Dictionary!
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