

Pivoting

Algorithm: PIVOT

Input: tuple $(N, B, A, b, c, v, \ell, e)$ where (N, B, A, b, c, v) is an LP in slack form,
 $\ell \in B$ is the index of the leaving variable, and
 $e \in N$ is the index of the entering variable

Output: tuple (N', B', A', b', c', v') which is a new LP in slack form

/* compute the coefficients of the equation for new basic variable x_e */

1. $b_e := b_\ell / a_{\ell, e}$
2. FOR $j \in N \setminus \{e\}$
3. $a'_{e, j} := a_{\ell, j} / a_{\ell, e}$
4. $a'_{e, \ell} := 1 / a_{\ell, e}$

/* compute the coefficients of the remaining constraints */

5. FOR $i \in B \setminus \{\ell\}$
6. $b'_i := b_i - a_{i, e} b'_e$
7. FOR $j \in N \setminus \{e\}$
8. $a'_{ij} := a_{ij} - a_{i, e} a'_{e, j}$
9. $a'_{i, \ell} := -a_{i, e} a'_{e, \ell}$

/* compute the objective function */

10. $v' := v + c_e b'_e$
11. FOR $j \in N \setminus \{e\}$
12. $c'_j := c_j - c_e a'_{e, j}$
13. $c'_\ell := -c_e a'_{e, \ell}$

/* compute newsets of basic and nonbasic variables */

14. $N' := N \setminus \{e\} \cup \{\ell\}$
15. $B' := B \setminus \{\ell\} \cup \{e\}$
16. RETURN (N', B', A', b', c', v')