

## 1 Short tableau from canonical form

Given the an lp in canonical form like eq. (1) the short tableau is created simply reading the values. The Equation eq. (2) is an example which is transformed into the short tableau in table 1.

$$\begin{array}{ll}
 \max & c^\top x \\
 \text{s.t.} & Ax \leq b \\
 & x \in \mathbb{R}_{\geq 0}
 \end{array} \quad (1)
 \qquad
 \begin{array}{ll}
 \max & x_1 + x_2 \\
 \text{s.t.} & x_1 \leq 4 \\
 & x_2 \leq 4 \\
 & x_1 + x_2 \leq 7 \\
 & -x_1 - x_2 \leq -3 \\
 & x_1, x_2 \in \mathbb{R}_{\geq 0}
 \end{array} \quad (2)$$

	$x_1$	$x_2$	1
$z$	-1	-1	0
$y_1$	1	0	4
$y_2$	0	1	4
$y_3$	1	0	4
$y_4$	1	1	7
$y_5$	-1	-1	-3

Table 1: Short tableau for eq. (2)

## 2 Exchange step rules for short tableau

We pivot on the element  $A_{p_r p_c}$ .

Pivot element

$$A'_{p_r p_c} = \frac{1}{A_{p_r p_c}} \quad (3)$$

Pivot row

$$A'_{p_r c} = \frac{A_{p_r c}}{A_{p_r p_c}} \quad (4)$$

Pivot column

$$A'_{r p_c} = -\frac{A_{r p_c}}{A_{p_r p_c}} \quad (5)$$

other A

$$A'_{rc} = A_{rc} - \frac{A_{r p_c} A_{p_r c}}{A_{p_r p_c}} \quad (6)$$

pivot row b

$$b'_{p_r} = \frac{b_{p_r}}{A_{p_r p_c}} \quad (7)$$

other b

$$b'_r = b_r - \frac{A_{r p_c} b_{p_r}}{A_{p_r p_c}} \quad (8)$$