Solução óptima contínua

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | |
|---|---|---|---|---|---|
| $x_3$ | 3 | 5 | 1 | 0 | 11 |
| $x_4$ | 4 | 1 | 0 | 1 | 8 |
| | -8 | -6 | 0 | 0 | 0 |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | |
|---|---|---|---|---|---|
| $x_3$ | 0 | $17/4$ | 1 | $-3/4$ | 5 |
| $x_1$ | 1 | $1/4$ | 0 | $1/4$ | 2 |
| | 0 | -4 | 0 | 2 | 16 |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | |
|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | $4/17$ | $-3/17$ | $20/17$ |
| $x_1$ | 1 | 0 | $-1/17$ | $5/17$ | $29/17$ |
| | 0 | 0 | $16/17$ | $22/17$ | $352/17$ |

Solução óptima discreta (problema inteiro puro)

$29/17 = 1 + 12/17$ $\qquad f_1 = 12/17$

$20/17 = 1 + 3/17$ $\qquad f_2 = 3/17$

A eq. de corte deve ser gerada a partir da linha de $x_1$

$-1/17 = -1 + 16/17$ $\qquad f_{13} = 16/17$

$5/17 = 0 + 5/17$ $\qquad f_{14} = 5/17$

Eq. de corte $\quad 16/17\, x_3 + 5/17\, x_4 \geq 12/17$

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | |
|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | $4/17$ | $-3/17$ | 0 | $20/17$ |
| $x_1$ | 1 | 0 | $-1/17$ | $5/17$ | 0 | $29/17$ |
| $x_5$ | 0 | 0 | $-16/17$ | $-5/17$ | 1 | $-12/17$ ← |
| | 0 | 0 | $16/17$ | $22/17$ | 0 | $352/17$ |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | |
|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | $-1/4$ | $1/4$ | 1 |
| $x_1$ | 1 | 0 | 0 | $5/16$ | $-1/16$ | $7/4$ |
| $x_3$ | 0 | 0 | 1 | $5/16$ | $-17/16$ | $3/4$ |
| | 0 | 0 | 0 | 1 | 1 | 20 |

$f_1 = f_3 = 3/4$

$f_{14} = 5/16 \quad f_{15} = 15/16$

$f_{34} = 5/16 \quad f_{35} = 15/16$

A eq. de corte gerada irá ser a mesma qualquer que seja a linha escolhida.

Eq. de corte $5/16\, x_4 + 15/16\, x_5 \geq 3/4$

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | $x_6$ | |
|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | $-1/4$ | $1/4$ | 0 | 1 |
| $x_1$ | 1 | 0 | 0 | $5/16$ | $-1/16$ | 0 | $7/4$ |
| $x_3$ | 0 | 0 | 1 | $5/16$ | $-17/16$ | 0 | $3/4$ |
| $x_6$ | 0 | 0 | 0 | $-5/16$ | $-15/16$ | 1 | $-3/4$ ← |
| | 0 | 0 | 0 | 1 | 1 | 0 | 20 |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | $x_6$ | |
|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | $-1/3$ | 0 | $4/15$ | $4/5$ |
| $x_1$ | 1 | 0 | 0 | $1/3$ | 0 | $-1/15$ | $9/5$ |
| $x_3$ | 0 | 0 | 1 | $2/3$ | 0 | $-17/15$ | $8/5$ |
| $x_5$ | 0 | 0 | 0 | $1/3$ | 1 | $-16/15$ | $4/5$ |
| | 0 | 0 | 0 | $2/3$ | 0 | $16/15$ | $96/5$ |

A equação de $x_5$ tornou-se não efectiva e pode ser eliminada do quadro.

$$f_1 = f_2 = 4/5$$

$$f_{14} = 1/3 \qquad f_{15} = 14/15$$

$$f_{24} = 2/3 \qquad f_{25} = 4/5$$

$$\text{máx}\left\{ \frac{4/5}{1/3 + 14/15}, \frac{4/5}{2/3 + 4/15} \right\} = \text{máx}\left\{ 0{,}63 ; 0{,}85 \right\}$$

A linha escolhida deve ser a de $x_2$

Eq de corte $2/3\, x_4 + 4/15\, x_6 \geq 4/5$

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_6$ | $x_7$ | |
|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | $-1/3$ | $4/15$ | 0 | $4/5$ |
| $x_1$ | 1 | 0 | 0 | $1/3$ | $-1/15$ | 0 | $9/5$ |
| $x_3$ | 0 | 0 | 1 | $2/3$ | $-17/15$ | 0 | $8/5$ |
| $x_7$ | 0 | 0 | 0 | $-2/3$ | $-4/15$ | 1 | $-4/5$ |
| | 0 | 0 | 0 | $2/3$ | $16/15$ | 0 | $96/5$ |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_6$ | $x_7$ | |
|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | 0 | $2/5$ | $-1/2$ | $6/5$ |
| $x_1$ | 1 | 0 | 0 | 0 | $-1/5$ | $1/2$ | $7/5$ |
| $x_3$ | 0 | 0 | 1 | 0 | $-7/5$ | 1 | $4/5$ |
| $x_4$ | 0 | 0 | 0 | 1 | $2/5$ | $-3/2$ | $6/5$ |
| | 0 | 0 | 0 | 0 | $4/5$ | 1 | $92/5$ |

Maior $f_i$ — $f_3 = 4/5$

$f_{36} = 3/5$ $\qquad$ $f_{37} = \emptyset$

Eq. de corte $3/5\, x_6 \geq 4/5$

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_6$ | $x_7$ | $x_8$ | |
|---|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | 0 | $2/5$ | $-1/2$ | 0 | $6/5$ |
| $x_1$ | 1 | 0 | 0 | 0 | $-1/5$ | $1/2$ | 0 | $7/5$ |
| $x_3$ | 0 | 0 | 1 | 0 | $-7/5$ | 1 | 0 | $4/5$ |
| $x_4$ | 0 | 0 | 0 | 1 | $2/5$ | $-3/2$ | 0 | $6/5$ |
| $x_8$ | 0 | 0 | 0 | 0 | $-3/5$ | 0 | 1 | $-4/5$ |
| | 0 | 0 | 0 | 0 | $4/5$ | 1 | 0 | $92/5$ |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_6$ | $x_7$ | $x_8$ | |
|---|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | 0 | 0 | $-1/2$ | $2/3$ | $2/3$ |
| $x_1$ | 1 | 0 | 0 | 0 | 0 | $1/2$ | $-1/3$ | $5/3$ |
| $x_3$ | 0 | 0 | 1 | 0 | 0 | 1 | $-7/3$ | $8/3$ |
| $x_4$ | 0 | 0 | 0 | 1 | 0 | $-3/2$ | $2/3$ | $2/3$ |
| $x_6$ | 0 | 0 | 0 | 0 | 1 | 0 | $-5/3$ | $4/3$ |
| | 0 | 0 | 0 | 0 | 0 | 1 | $4/3$ | $52/3$ |

A linha de $x_6$ pode ser dispensada.

$$f_1 = f_2 = f_3 = f_4 = 2/3$$

$$\begin{aligned} f_{27} &= 1/2 & f_{28} &= 2/3 \\ f_{17} &= 1/2 & f_{18} &= 2/3 \\ f_{37} &= \emptyset & f_{38} &= 2/3 \\ f_{47} &= 1/2 & f_{48} &= 1/3 \end{aligned}$$

$$\text{Máx}\left\{ \frac{2/3}{1/2+2/3} , \frac{2/3}{0+2/3} , \frac{2/3}{1/2+1/3} \right\} = \text{Máx}\left\{ 0{,}57 \ , \ 1 \ , \ 0{,}8 \right\}$$

A linha escolhida deve ser a de $x_3$

Eq. de corte $2/3\, x_8 \geq 2/3$

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_7$ | $x_8$ | $x_9$ | |
|---|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | 0 | $-1/2$ | $2/3$ | 0 | $2/3$ |
| $x_1$ | 1 | 0 | 0 | 0 | $1/2$ | $-1/3$ | 0 | $5/3$ |
| $x_3$ | 0 | 0 | 1 | 0 | 1 | $-7/3$ | 0 | $8/3$ |
| $x_4$ | 0 | 0 | 0 | 1 | $-3/2$ | $2/3$ | 0 | $2/3$ |
| $x_9$ | 0 | 0 | 0 | 0 | 0 | $-2/3$ | 1 | $-2/3$ |
| | 0 | 0 | 0 | 0 | 1 | $4/3$ | 0 | $52/3$ |

| | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_7$ | $x_8$ | $x_9$ | |
|---|---|---|---|---|---|---|---|---|
| $x_2$ | 0 | 1 | 0 | 0 | $-1/2$ | 0 | 1 | 0 |
| $x_1$ | 1 | 0 | 0 | 0 | $1/2$ | 0 | $-1/2$ | 2 |
| $x_3$ | 0 | 0 | 1 | 0 | 1 | 0 | $-7/2$ | 5 |
| $x_4$ | 0 | 0 | 0 | 1 | $-3/2$ | 0 | 1 | 0 |
| $x_8$ | 0 | 0 | 0 | 0 | 0 | 1 | $-3/2$ | 1 |
| | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 16 |

Solução óptima discreta para $x_1^* = 2$ , $x_2^* = \emptyset$