6.- (a) • $x_3 = +4 + 9x_1$

$+2 + 9$

$|+11|$

• $x_2 = -2 - 4x_1$

$-2 - 4$

$|-6|$

• $x_0 = -1 + 3x_1$

$|+2|$

$$\begin{cases} x_3 = +2 + 9x_1 \\ x_0 = -1 + 3x_1 \\ x_2 = -2 - 4x_1 \end{cases}$$

We are bounded by $1 \leq x_1 \leq 2$!

We can't set x_2 to 0 this time

We need to set x_1 to be low or upper bound of x_1

(b) min $x_1 - 2x_3$ min $-17x_1 - 4$

$x_1 - 2(+2 + 9x_1)$

$x_1 - 4 - 18x_1$

$1 \leq x_1$ } Best possible = $|-21|$

(c) $-17x_1 - 4$

$|-17|$

(d) NO, the bounds of x_1 are $1 \leq x_1 \leq 2$ so we can improve the bounds by Bound flip.

$-17(2) - 4 = |-31|$

7.- (a) $\Theta(n^3)$ $O(n \cdot (n-1)(n-2))$

(b) $\Theta(n^2)$ additional variables

$\Theta(n^2)$ total number of clause

(c) /

ABELLA GASSOL, ARNAU

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1-

(a) $D_{x_0} = \{0, 1\}$

(b) $D_{x_2} = \{0, 2\}$

(c) $D_{x_4} = \{0, 2\}$

---

2 -

(a) $D_{x_0} = \{0, 1\}$

(b) $D_{x_2} = \{0, 2\}$

(c) $D_{x_4} = \{0, 2\}$

3.- (a) $D_0 = \{0, 1\}$

(b) $D_2 = \{0, 1, 2\}$

(c) $D_4 = \{0, 2\}$

4.- (a) $D_0 = \{0, 1\}$

(b) $D_2 = \{0, 2\}$

(c) $D_4 = \{0, 2\}$

5.- (a)
- Basic variable x_2 to value $+2$
- " " x_1 " " $+2$

$$\begin{cases} x_1 = +2 - 4x_0 + 2x_3 \\ x_2 = +2 - 2x_0 + x_3 \end{cases}$$

(b) $+4$

$$\min x_0 + 2x_2 - 3 \Rightarrow +4 - 3x_0 + x_3$$

(c) Reduced cost of x_0 is -3

" " x_3 is $+1$

(d) NO

Best value is 0

(e) YES