$$\text{Max } 2x_1 + x_2$$

$$(P) \quad \begin{cases} -x_1 + 2x_2 \le +4 \\ 2x_1 + 3x_2 \le 13 \\ 4x_1 + x_2 \le 16 \\ x_1, x_2 \ge 0 \end{cases} \longrightarrow (D) \quad \begin{cases} \text{Min } 4y_1 + 13y_2 + 16y_3 \\ -y_1 + 2y_2 + 4y_3 \ge 2 \\ 2y_1 + 3y_2 + y_3 \ge 1 \\ y_1, y_2, y_3 \ge 0 \end{cases}$$

$$A = \begin{pmatrix} -1 & 2 \\ 2 & +3 \\ 4 & 1 \end{pmatrix} \quad b^T = (4 \quad 13 \quad 16) \qquad \bar{x} = (7/2 \quad 2)$$

$$C = (2 \quad 1)$$

- Scarti complementari

$$\begin{matrix} y^T(b - Ax) = 0 \\ (A^T y - c)^T x = 0 \end{matrix} \longrightarrow \begin{cases} y_1(x_1 - 2x_2 + 4) = 0 \\ y_2(-2x_1 - 3x_2 + 13) = 0 \\ y_3(-4x_1 - x_2 + 16) = 0 \end{cases} \rightarrow \begin{cases} 7/2\, y_1 = 0 \\ 0 = 0y_2 \\ 0 = 0y_3 \end{cases}$$

$$\downarrow$$

$$\begin{cases} (-y_1 + 2y_2 + 4y_3 - 2)x_1 = 0 \\ (2y_1 - 3y_2 + y_3 - 1)x_2 = 0 \\ y_1 = 0 \end{cases} \rightarrow \begin{cases} 2y_2 + 4y_3 = +2 \\ +3y_2 + y_3 = +1 \end{cases}$$

$$\downarrow$$

$$\begin{cases} y_2 = 1/5 \\ y_3 = 2/5 \end{cases} \quad \bar{y} = (0 \quad 1/5 \quad 2/5)$$

$$C^T\bar{x} = C^T\bar{y} \rightarrow 9 = 9$$