$$min - 5x_1 - x_2 - x_3 + x_4$$

$$\begin{cases} x_1 & & +2x_3 & -2x_4 & = 2 \\ 3x_1 & +x_2 & -x_3 & +x_4 & = 4 \end{cases};$$

$$A = \begin{bmatrix} 1 & 0 & 2 & -2 \\ 3 & 1 & -1 & 1 \end{bmatrix}; \qquad b = \begin{bmatrix} 2 \\ 4 \end{bmatrix}; \qquad c = \begin{bmatrix} -5 \\ -1 \\ -1 \\ 1 \end{bmatrix};$$

$$B = \begin{bmatrix} A_2 & A_3 \end{bmatrix} = \begin{bmatrix} 0 & 2 \\ 1 & -1 \end{bmatrix}; \quad \begin{cases} B(1) = 2; \\ B(2) = 3; \end{cases}$$

$$\boxed{B^{-1} = \frac{1}{det(B)} * \left[Cof(B)\right]^T} = -\frac{1}{2} \times \begin{bmatrix} -1 & -1 \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 1/2 & 1/2 \\ 1 & 0 \end{bmatrix};$$

$$\boxed{u^T = c_B^T B^{-1}} = \begin{bmatrix} -1 & -1 \end{bmatrix} \begin{bmatrix} 1/2 & 1/2 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} (-\frac{1}{2} - 1) & -\frac{1}{2} \end{bmatrix} = \begin{bmatrix} -\frac{3}{2} & -\frac{1}{2} \end{bmatrix};$$

$$\boxed{\overline{c}_F = c_j - u^T A_j} = \begin{cases} \overline{c_1} = & -5 & - \begin{bmatrix} -\frac{3}{2} & -\frac{1}{2} \end{bmatrix} \begin{bmatrix} 1 \\ 3 \end{bmatrix} & = -5 - (-\frac{3}{2} - \frac{1}{2}) & = \boxed{\text{-2}} \\ \overline{c_4} = & 1 & - \begin{bmatrix} -\frac{3}{2} & -\frac{1}{2} \end{bmatrix} \begin{bmatrix} -2 \\ 1 \end{bmatrix} & = 1 - (-3 - \frac{1}{2}) & = \frac{9}{2} \end{cases};$$

$B = \begin{bmatrix} A_2 & A_2 \end{bmatrix}$ non è ottima per $\overline{c_F} < 0$.

La variabile entrante per $\overline{c_F} < 0$ è $\boxed{\overline{c_h} = \overline{c_1}} = -2 \implies \boxed{x_h = x_1}$.

$$\boxed{\overline{b} = B^{-1} b} = \begin{bmatrix} 1/2 & 1/2 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \end{bmatrix};$$

$$\boxed{\overline{A}_h = \overline{A}_1 = B^{-1} A_1} = \begin{bmatrix} 1/2 & 1/2 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 3 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix};$$

$$\frac{\overline{b}_m}{\overline{a}_{m,h}} = \begin{cases} \dfrac{\overline{b}_1}{\overline{a}_{1,h}} = \dfrac{\overline{b}_1}{\overline{a}_{1,1}} = \dfrac{3}{1} = 3 \\ \dfrac{\overline{b}_2}{\overline{a}_{2,h}} = \dfrac{\overline{b}_2}{\overline{a}_{2,1}} = \dfrac{2}{1} = \boxed{2} \end{cases}; \qquad \boxed{\frac{\overline{b}_m}{\overline{a}_{m,h}} > 0}$$

problema non illimitato.

$x_{B(2)} = x_3$
è la variabile uscente.