TAREA 1 - DAVID CORZO

1) Encuentre la FERR de las siguientes matrices.

a) $A = \begin{bmatrix} 2 & 6 & 10 \\ 4 & 20 & 30 \end{bmatrix} \begin{matrix} \frac{1}{2}F_1 \\ \frac{1}{4}F_2 \end{matrix} = \begin{bmatrix} 1 & 3 & 5 \\ 1 & 5 & \frac{15}{2} \end{bmatrix} F_2 - F_1$

$= \begin{bmatrix} 1 & 3 & 5 \\ 0 & 2 & \frac{5}{2} \end{bmatrix} \frac{1}{2}F_2 = \begin{bmatrix} 1 & 3 & 5 \\ 0 & 1 & \frac{5}{4} \end{bmatrix} =$

$F_1 - 3F_2 \begin{bmatrix} 1 & 0 & \frac{5}{4} \\ 0 & 1 & \frac{5}{4} \end{bmatrix}$ ✗

b) $B = \begin{bmatrix} 1 & 3 & 1 & 3 \\ 2 & 7 & 6 & 8 \end{bmatrix} F_2 - 2F_1 = \begin{bmatrix} 1 & 3 & 1 & 3 \\ 0 & 1 & 4 & 2 \end{bmatrix} =$

$F_1 - 3F_2 = \begin{bmatrix} 1 & 0 & -11 & -3 \\ 0 & 1 & 4 & 2 \end{bmatrix}$ ✗

2) Gaus ó Gaus-Jordan

a)
$$3r + s = 0$$
$$6r + 2s = 0 \quad = \quad \begin{bmatrix} 3 & 1 & | & 0 \\ 6 & 2 & | & 0 \\ 3 & 5 & | & 0 \end{bmatrix} \frac{1}{3}F_2$$
$$3r + 5s = 0$$

$= \begin{bmatrix} 1 & \frac{1}{3} & | & 0 \\ 6 & 2 & | & 0 \\ 3 & 5 & | & 0 \end{bmatrix} F_2 - 6F_1 = \begin{bmatrix} 1 & \frac{1}{3} & | & 0 \\ 0 & 0 & | & 0 \\ 3 & 5 & | & 0 \end{bmatrix} \rangle$

$= \begin{bmatrix} 1 & \frac{1}{3} & | & 0 \\ 3 & 5 & | & 0 \\ 0 & 0 & | & 0 \end{bmatrix} F_2 - 3F_1 = \begin{bmatrix} 1 & \frac{1}{3} & | & 0 \\ 0 & 4 & | & 0 \end{bmatrix} \frac{1}{4}F_2$

$$
= \begin{bmatrix} 1 & \frac{1}{3} & | & 0 \\ 0 & 1 & | & 0 \\ 0 & 0 & | & 0 \end{bmatrix} \begin{array}{l} F_1 - \frac{1}{3}F_2 \end{array} = \begin{bmatrix} 1 & 0 & | & 0 \\ 0 & 1 & | & 0 \\ 0 & 0 & | & 0 \end{bmatrix}
$$

$r = 0 \ , \ s = 0 \qquad una \qquad solución$

b)

$$
\begin{aligned}
x_1 \quad - 3x_2 - 2x_3 &= 0 \\
2x_1 \quad - \ x_2 \ + x_3 &= 0 \\
2x_1 + 4x_2 + 6x_3 &= 0
\end{aligned}
\qquad = \begin{bmatrix} 1 & -3 & -2 & | & 0 \\ 2 & -1 & 1 & | & 0 \\ 2 & 4 & 6 & | & 0 \end{bmatrix} \begin{array}{l} F_2 - 2F_1 \end{array}
$$

$$
= \begin{bmatrix} 1 & -3 & -2 & | & 0 \\ 0 & 5 & 5 & | & 0 \\ 2 & 4 & 6 & | & 0 \end{bmatrix} \begin{array}{l} F_3 - 2F_1 \end{array} = \begin{bmatrix} 1 & -3 & -2 & | & 0 \\ 0 & 5 & 5 & | & 0 \\ 0 & 10 & 10 & | & 0 \end{bmatrix} \begin{array}{l} F_3 - 2F_2 \end{array} =
$$

$$
= \begin{bmatrix} 1 & -3 & -2 & | & 0 \\ 0 & 5 & 5 & | & 0 \\ 0 & 0 & 0 & | & 0 \end{bmatrix} \begin{array}{l} \frac{1}{5}F_2 \end{array} = \begin{bmatrix} 1 & -3 & -2 & | & 0 \\ 0 & 1 & 1 & | & 0 \\ 0 & 0 & 0 & | & 0 \end{bmatrix} \begin{array}{l} F_1 + 3F_2 \end{array} =
$$

$$
\begin{bmatrix} 1 & 0 & 1 & | & 0 \\ 0 & 1 & 1 & | & 0 \\ 0 & 0 & 0 & | & 0 \end{bmatrix} = \begin{cases} x_1 + x_3 = 0 \\ x_2 + x_3 = 0 \end{cases}
$$

$$
\begin{aligned}
x_1 &= -x_3 \\
x_2 &= -x_3 \\
x_3 &= x_3
\end{aligned}
\qquad \vec{S} = \begin{bmatrix} -x^3 \\ -x^3 \\ x_3 \end{bmatrix} \qquad \text{infinitas sols.}
$$

c)

$$
\begin{aligned}
a \ + \ b \ + \ c \ + \ d &= 10 \\
a \ + \ 2b \ + \ 3c \ + \ 4d &= 30 \\
a \ + \ 3b \ + \ 6c \ + \ 10d &= 60 \\
a \ + \ 4b \ + \ 8c \ + \ 15d &= 100
\end{aligned}
$$

$$\begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 1 & 2 & 3 & 4 & | & 30 \\ 1 & 3 & 6 & 10 & | & 60 \\ 1 & 4 & 8 & 15 & | & 100 \end{bmatrix} \begin{matrix} \\ F_2 - F_1 \\ F_3 - F_1 \\ F_4 - F_1 \end{matrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 2 & 3 & | & 20 \\ 0 & 2 & 5 & 9 & | & 50 \\ 0 & 3 & 7 & 14 & | & 90 \end{bmatrix} \begin{matrix} \\ \\ F_3 - 2F_2 \\ F_4 - 3F_2 \end{matrix}$$

$$= \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 2 & 3 & | & 20 \\ 0 & 0 & 1 & 3 & | & 10 \\ 0 & 0 & 1 & 5 & | & 30 \end{bmatrix} \begin{matrix} \\ \\ \\ F_4 - F_3 \end{matrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 2 & 3 & | & 20 \\ 0 & 0 & 1 & 3 & | & 10 \\ 0 & 0 & 0 & 2 & | & 20 \end{bmatrix} \begin{matrix} \\ \\ \\ F_4 - F_2 \end{matrix} =$$

$$= \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 2 & 3 & | & 20 \\ 0 & 0 & 1 & 3 & | & 10 \\ 0 & 0 & 0 & 1 & | & 10 \end{bmatrix} \begin{matrix} \\ F_2 - F_3 \\ \\ \end{matrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 1 & 0 & | & 10 \\ 0 & 0 & 1 & 3 & | & 10 \\ 0 & 0 & 0 & 1 & | & 10 \end{bmatrix} \begin{matrix} \\ \\ F_3 - 3F_4 \\ \end{matrix} =$$

$$= \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 1 & 0 & | & 10 \\ 0 & 0 & 1 & 0 & | & -20 \\ 0 & 0 & 0 & 1 & | & 10 \end{bmatrix} \begin{matrix} \\ F_2 - F_3 \\ \\ \end{matrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & | & 10 \\ 0 & 1 & 0 & 0 & | & 30 \\ 0 & 0 & 1 & 0 & | & -20 \\ 0 & 0 & 0 & 1 & | & 10 \end{bmatrix} \begin{matrix} F_1 - F_2 - F_3 - F_4 \\ \\ \\ \end{matrix}$$

$$= \begin{bmatrix} 1 & 0 & 0 & 0 & | & -10 \\ 0 & 1 & 0 & 0 & | & 30 \\ 0 & 0 & 1 & 0 & | & -20 \\ 0 & 0 & 0 & 1 & | & 10 \end{bmatrix} = \begin{cases} a = -10 \\ b = 30 \\ c = -20 \\ d = 10 \end{cases} \quad \text{Única} \quad \text{Solución}$$

3)

$$14f + 20m = 2100$$
$$f + m = 135$$

$$\begin{bmatrix} 20 & 14 & | & 2100 \\ 1 & 1 & | & 135 \end{bmatrix} \begin{matrix} F_1/14 \\ \\ \end{matrix}$$

$$= \begin{bmatrix} 1 & \frac{10}{7} & | & 150 \\ 1 & 1 & | & 135 \end{bmatrix} = \begin{bmatrix} 1 & \frac{10}{7} & | & 150 \\ 0 & -\frac{3}{7} & | & -15 \end{bmatrix} \begin{matrix} \\ F_2 \cdot -\frac{7}{?} \end{matrix}$$

$$= \begin{bmatrix} 1 & \frac{10}{7} & \Big| & 150 \\ 0 & 1 & \Big| & 35 \end{bmatrix} \begin{array}{c} F_1 - \frac{10}{7} F_2 \end{array} = \begin{bmatrix} 1 & 0 & \Big| & 100 \\ 0 & 1 & \Big| & 35 \end{bmatrix}$$

$$= \begin{cases} f = 100 \\ m = 35 \end{cases}$$

Compraron 100 lb fvusa & 35lb mora.