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(20) a)

$$A=\begin{pmatrix}1&1&1&2\\2&3&5&11\\1&-1&6&29\end{pmatrix}\sim\begin{pmatrix}1&1&1&2\\0&1&3&7\\0&-2&5&27\end{pmatrix}$$

$F_2=F_2-2F_1$ $F_3=F_3-F_1$ $F_3=F_3+2F_2$

$$\begin{pmatrix}1&1&1&2\\0&1&3&7\\0&0&11&41\end{pmatrix}$$ RANGO 3

3 columnas linealmente independientes

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$$B=\begin{pmatrix}2&1&3\\4&2&-1\\6&3&2\end{pmatrix}\sim\begin{pmatrix}2&1&3\\0&0&-7\\0&0&-7\end{pmatrix}$$

$F_2=F_2-2F_1$ $F_3=F_3-3F_1$ $F_3=F_3-F_2$

$$\begin{pmatrix}2&1&3\\0&0&-7\\0&0&0\end{pmatrix}$$ Rango B = 2

2 columnas l. indep

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27 a)

$\bar{u}_1(1,-1,3,7)$ $\bar{u}_2(2,5,0,4)$

$$\begin{pmatrix}1&2\\-1&5\\3&0\\7&4\end{pmatrix}\sim\begin{pmatrix}1&-1&3&7\\2&5&0&4\end{pmatrix}\sim$$

$$\begin{pmatrix}1&-1&3&7\\0&7&-6&-10\end{pmatrix}$$ Son l. indep

RANGO 2

b) $\bar{v}_1=(1,0,-2,3,1)$ $\bar{v}_2(2,-1,3,0,2)$

$\bar{v}_3=(4,-1,-1,6,4)$

$$\begin{pmatrix}1&0&-2&3&1\\2&-1&3&0&2\\4&-1&-1&6&4\end{pmatrix}\sim\begin{pmatrix}1&0&-2&3&1\\0&-1&7&-6&0\\0&-1&7&-6&0\end{pmatrix}$$

$$\begin{pmatrix}1&0&-2&3&1\\0&-1&7&-6&0\\0&0&0&0&0\end{pmatrix}$$ l. depend

RANGO 2

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(28) $\bar{u}_1=(1,-1,0,2)$ $\bar{u}_2(2,0,1,-2)$

$\bar{u}_3=(3,1,1,t)$

$$\begin{pmatrix}1&-1&0&2\\2&0&1&-2\\3&1&1&t\end{pmatrix}\sim\begin{pmatrix}1&-1&0&2\\0&2&1&-6\\0&4&1&t-6\end{pmatrix}$$

$F_2=F_2-2F_1$ $F_3=F_3-3F_1$ $F_3=F_3-2F_2$

$$\begin{pmatrix}1&-1&0&2\\0&2&1&-6\\0&0&-1&t+6\end{pmatrix}$$ l. indep

$$\begin{pmatrix}1&5&3&3\\2&-2&0&0\\2&6&4&4\\1&1&1&t\end{pmatrix}\sim\begin{pmatrix}1&5&3&3\\2&-2&0&0\\2&6&4&4\\1&1&1&t\end{pmatrix}$$

$$\sim\begin{pmatrix}1&5&3&3\\0&-12&-6&-6\\0&-4&-2&-2\\0&-4&-2&t-3\end{pmatrix}\sim\begin{pmatrix}1&5&3&3\\0&-12&-6&-6\\0&0&0&0\\0&0&0&-3t+3\end{pmatrix}$$

$-3t+3=0$ $t=1$

CASO I $t=1$ l. dep RANGO 2

CASO II $t\neq 1$ l. dep RANGO 3

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$$M=\begin{pmatrix}1&-1&-1\\1&-1&2\\2&1&k\end{pmatrix}\sim\begin{pmatrix}1&-1&-1\\0&0&3\\0&3&k+2\end{pmatrix}\sim\begin{pmatrix}1&-1&-1\\0&3&k+2\\0&0&3\end{pmatrix}$$

RANGO $M=3$

$$N=\begin{pmatrix}2&-1&4\\-2&1&3\\1&k&2\end{pmatrix}\sim\begin{pmatrix}2&4&-1\\-2&3&1\\1&2&k\end{pmatrix}\sim$$

$$\begin{pmatrix}2&4&-1\\0&7&0\\0&0&2k+1\end{pmatrix}\quad 2k+1=0\quad k=-1/2$$

CASO $k=-1/2$ RANGO $N=2$

CASO $k\neq -1/2$ RANGO $N=3$

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PROBLEMAS CON MATRICES

PAG 71 (11)

$$A=\begin{array}{c}\\E1\\E2\end{array}\begin{array}{c}\begin{array}{ccc}P&Q&R\end{array}\\\begin{pmatrix}500&300&200\\600&400&300\end{pmatrix}\end{array}$$

$$B=\begin{array}{c}\\P\\Q\\R\end{array}\begin{array}{c}\begin{array}{cccc}m1&m2&m3&m4\end{array}\\\begin{pmatrix}10&0&50&10\\0&20&60&5\\0&0&30&30\end{pmatrix}\end{array}$$

$$C=\begin{array}{c}\\m1\\m2\\m3\\m4\end{array}\begin{array}{c}\begin{array}{cc}E1&E2\end{array}\\\begin{pmatrix}500&2\\600&3\\500&1\\600&4\end{pmatrix}\end{array}$$

a) $AB=$

	P	Q	R
E1	500	300	200
E2	600	400	300

×

	m1	m2	m3	m4
P	10	0	50	10
Q	0	20	60	5
R	0	0	30	30

=

	m1	m2	m3	m4
E1	5000	6000	49000	11500
E2	6000	8000	63000	14000

Materia 1 (m1 tinta, m2 gas, m3 plastico, m4 metal) que suministra cada almacen (E1 y E2)

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