

ARELLANO GRANADOS ANGEL MARIANO  
218123444



## **SEMINARIO DE SOLUCIÓN DE PROBLEMAS DE MÉTODOS MATEMÁTICOS III**

**I7021 D15**

**Norma Elva Espino Rojas**

**ARELLANO GRANADOS ANGEL MARIANO**

**218123444**

**ACTIVIDAD DE SISTEMAS**

**ACTIVIDAD # 7**

**FECHA:**

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Obtención de Formulas Sistema 4x4:

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & b_1 \\ a_{21} & a_{22} & a_{23} & a_{24} & b_2 \\ a_{31} & a_{32} & a_{33} & a_{34} & b_3 \\ a_{41} & a_{42} & a_{43} & a_{44} & b_4 \end{pmatrix}$$

$$F_2 + F_1 \left( -\frac{a_{21}}{a_{11}} \right) \rightarrow F_3 + F_1 \left( -\frac{a_{31}}{a_{11}} \right) \rightarrow F_4 + F_1 \left( -\frac{a_{41}}{a_{11}} \right) \rightarrow$$

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & b_1 \\ 0 & \frac{a_{22}a_{11} - a_{12}a_{21}}{a_{11}} & \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} & \frac{a_{24}a_{11} - a_{14}a_{21}}{a_{11}} & \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \\ 0 & \frac{a_{32}a_{11} - a_{12}a_{31}}{a_{11}} & \frac{a_{33}a_{11} - a_{13}a_{31}}{a_{11}} & \frac{a_{34}a_{11} - a_{14}a_{31}}{a_{11}} & \frac{b_3a_{11} - b_1a_{31}}{a_{11}} \\ 0 & \frac{a_{42}a_{11} - a_{12}a_{41}}{a_{11}} & \frac{a_{43}a_{11} - a_{13}a_{41}}{a_{11}} & \frac{a_{44}a_{11} - a_{14}a_{41}}{a_{11}} & \frac{b_4a_{11} - b_1a_{41}}{a_{11}} \end{pmatrix}$$

$$F_3 + F_2 \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) \rightarrow F_4 + F_2 \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right) \rightarrow$$

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & b_1 \\ 0 & \frac{a_{22}a_{11} - a_{12}a_{21}}{a_{11}} & \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} & \frac{a_{24}a_{11} - a_{14}a_{21}}{a_{11}} & \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \\ 0 & 0 & \frac{a_{33}a_{11} - a_{13}a_{31}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) & \frac{a_{34}a_{11} - a_{14}a_{31}}{a_{11}} + \frac{a_{24}a_{11} - a_{14}a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) & \frac{b_3a_{11} - b_1a_{31}}{a_{11}} + \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) \\ 0 & 0 & \frac{a_{43}a_{11} - a_{13}a_{41}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right) & \frac{a_{44}a_{11} - a_{14}a_{41}}{a_{11}} + \frac{a_{24}a_{11} - a_{14}a_{21}}{a_{11}} \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right) & \frac{b_4a_{11} - b_1a_{41}}{a_{11}} + \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right) \end{pmatrix}$$

$$F_4 + F_3 \left( -\frac{\frac{a_{43}a_{11} - a_{13}a_{41}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right)}{\frac{a_{33}a_{11} - a_{13}a_{31}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right)} \right) = (\text{simpl}) \rightarrow$$

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & b_1 \\ 0 & \frac{a_{22}a_{11} - a_{12}a_{21}}{a_{11}} & \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} & \frac{a_{24}a_{11} - a_{14}a_{21}}{a_{11}} & \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \\ 0 & 0 & \frac{a_{33}a_{11} - a_{13}a_{31}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) & \frac{a_{34}a_{11} - a_{14}a_{31}}{a_{11}} + \frac{a_{24}a_{11} - a_{14}a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) & \frac{b_3a_{11} - b_1a_{31}}{a_{11}} + \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right) \\ 0 & 0 & 0 & \frac{\frac{a_{43}a_{11} - a_{13}a_{41}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right)}{\frac{a_{33}a_{11} - a_{13}a_{31}}{a_{11}} + \frac{a_{23}a_{11} - a_{13}a_{21}}{a_{11}} \left( -\frac{a_{32}a_{11} - a_{12}a_{31}}{a_{22}a_{11} - a_{12}a_{21}} \right)} & \frac{b_4a_{11} - b_1a_{41}}{a_{11}} + \frac{b_2a_{11} - b_1a_{21}}{a_{11}} \left( -\frac{a_{42}a_{11} - a_{12}a_{41}}{a_{22}a_{11} - a_{12}a_{21}} \right) \end{pmatrix}$$