## Ejercicio 1

$$\lambda_1 = \frac{a_{31}X + a_{32}Y + a_{33}Z + a_{34}}{X_1}$$

## Ejercicio 2

$$\lambda_1 X_1 = a_{11}X + a_{12}Y + a_{13}Z + a_{14} \quad (2)$$

## Ejercicio 3

$$(a_{31}X + a_{32}Y + a_{33}Z + a_{34})X_1 = a_{11}X + a_{12}Y + a_{13}Z + a_{14}$$

$$X_1 a_{31}X + X_1 a_{32}Y + X_1 a_{33}Z + X_1 a_{34} = a_{11}X + a_{12}Y + a_{13}Z + a_{14}$$

$$(X_1 a_{31} - a_{11})X + (X_1 a_{32} - a_{12})Y + (X_1 a_{33} - a_{13})Z + (X_1 a_{34} - a_{14}) = 0$$

$$r_1 = (a_{14} - X_1 a_{34})$$

$$q_{11} = X_1 a_{31} - a_{11}$$
$$q_{12} = X_1 a_{32} - a_{12}$$
$$q_{13} = X_1 a_{33} - a_{13}$$

## Ejercicio 4

$$\lambda_2 Y_1 = a_{21}X + a_{22}Y + a_{23}Z + a_{24}$$

$$r_2 = (a_{24} - Y_1 a_{34})$$
$$q_{21} = Y_1 a_{31} - a_{21}$$
$$q_{22} = Y_1 a_{32} - a_{22}$$
$$q_{23} = Y_1 a_{33} - a_{23}$$

## Ejercicio 5

$$Q_1 \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} q_{11}x + q_{12}y + q_{13}z \\ q_{21}x + q_{22}y + q_{23}z \end{bmatrix}$$

$$Q_1 = \begin{bmatrix} q_{11} & q_{12} & q_{13} \\ q_{21} & q_{22} & q_{23} \end{bmatrix}$$

$$\underbrace{\begin{bmatrix} q_{11} & q_{12} & q_{13} \\ q_{21} & q_{22} & q_{23} \end{bmatrix}}_{Q_1} \underbrace{\begin{bmatrix} x \\ y \\ z \end{bmatrix}}_{M} = \begin{bmatrix} r_1' \\ r_1 \\ r_2 \end{bmatrix}$$

## Ejercicio 6

$$r_3 = (b_{14} - x_1 b_{34}) \qquad r_4 = (b_{24} - y_2 b_{34})$$

$$q_{31} = x_2 b_{31} - b_{11} \qquad q_{41} = y_2 b_{31} - b_{21}$$

$$q_{32} = x_2 b_{32} - b_{12} \qquad q_{42} = y_2 b_{32} - b_{22}$$

$$q_{33} = x_2 b_{33} - b_{13} \qquad q_{43} = y_1 b_{33} - b_{33}$$

$$\underbrace{\begin{bmatrix} q_{31} & q_{32} & q_{33} \\ q_{41} & q_{42} & q_{43} \end{bmatrix}}_{Q_2} \underbrace{\begin{bmatrix} x \\ y \\ z \end{bmatrix}}_{M} = \begin{bmatrix} r_2' \\ r_3 \\ r_4 \end{bmatrix}$$

## Ejercicio 7

$$Q_2 \begin{bmatrix} Q_1 \\ Q_2 \end{bmatrix} \Rightarrow \begin{bmatrix} Q_1 \\ Q_2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} r_1' \\ r_2' \end{bmatrix}$$

## Ejercicio 8

Q es de $4 \times 3$

r es de $4 \times 1$

## Ejercicio 9

$$M = \begin{bmatrix} Q_1 r_1' \\ Q_2 r_2' \end{bmatrix}$$

## Ejercicio 10

$$M = \begin{bmatrix} Q_1 r_1' \\ Q_2 r_2' \\ Q_3 r_3' \end{bmatrix} //$$

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