1)

$3x_1 - x_3 = 5$

$\alpha x_1 + 2x_2 - x_3 = 2$

$-x_1 + x_2 + (\alpha+1)x_3 = 1$

$$\begin{pmatrix} 3 & 0 & -1 \\ \alpha & 2 & -1 \\ -1 & 1 & (\alpha+1) \end{pmatrix}$$

$(3 \cdot 2 \cdot (\alpha+1)) + (-1)(\alpha)(1) - (2) + 3$

$\det = 6\alpha + 6 - \alpha + 1$

$= 5\alpha + 7$

$\alpha = -\frac{7}{5}$

2)

$[a_{i,j}] \times = [b_i]$, $i, j = 1, 2, 3$

Sendo $a_{i,j} = 1/(i+j)$, $b_i = 2i$

2 x 2

$a_{11} = \frac{1}{2}$

$a_{12} = 1/3$

$a_{21} = 2/3$

$a_{22} = 1/2$

3 x 3

$$\begin{pmatrix} 1/2 & 1/3 & 1/4 \\ 2/3 & 1/4 & 1/5 \\ 3/4 & 1/5 & 1/6 \end{pmatrix}$$

$\frac{1}{2}x_1 + \frac{1}{3}x_2 + \frac{1}{4}x_3 \cdots \frac{1}{(i+j)}x_j = b_1$

$\frac{2}{3}x_1 + \frac{1}{2}x_2 + \frac{2}{5}x_3 \cdots \frac{2}{(i+j)}x_j = b_2$

$\frac{i}{i+1}x_1 + \frac{i}{i+2}x_2 + \frac{i}{i+3}x_3 \cdots \frac{i}{i+j}x_j = b_j$

2 x 2

$\begin{bmatrix} 12 \\ 24 \end{bmatrix}$

3 x 3

$\begin{bmatrix} 24 \\ -120 \\ 120 \end{bmatrix}$

4 x 4

$\begin{bmatrix} 240 \\ 360 \\ -240 \\ 60 \end{bmatrix}$

3)

$$3 = a_1(1) + 1.1051\,a_2 + a_3 - a_4$$
$$3 = 4a_1 + 1.2214\,a_2 + 2a_3 - a_4$$
$$2 = 16a_1 + 1.4918\,a_2 + 4a_3 - a_4$$
$$4 = 25a_1 + 1.6487\,a_2 + 5a_3 - a_4$$

$$\begin{pmatrix} 1 & 1.1051 & 1 & -1 \\ 4 & 1.2214 & 2 & -1 \\ 16 & 1.4918 & 4 & -1 \\ 25 & 1.6487 & 5 & -1 \end{pmatrix}$$

$a_1 = -16.9166$

$a_2 = 2500$

$a_3 = -238$

$a_4 = -2304.8337$

4) $x_1 = 121.3333$

$x_2 = -666.6666$

$x_3 = 648$

$$A^{-1} \begin{vmatrix} 4.6666 & -46.6666 & 56 \\ -13.3333 & 213.3333 & -260 \\ 9 & 160 & 252 \end{vmatrix}$$

5)

$x_1 = 227.5$

$x_2 = -970$

$x_3 = 852.75$

→

Variación

x_1 | 106.1667

x_2 | -303.3334

x_3 | 204.75

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