

Exercises 11.2, Mathematics 1 (12-PHY-BIPMA1)
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1. Solve the following systems of equations using Gaussian elimination:

(a)

$$\begin{aligned}x_1 + x_2 - 3x_3 &= -1, \\2x_1 + x_2 - 2x_3 &= 1, \\x_1 + x_2 + x_3 &= 3, \\x_1 + 2x_2 - 3x_3 &= 1.\end{aligned}$$

(b)

$$\begin{aligned}2x_1 - x_2 + 3x_3 &= 3, \\3x_1 + x_2 - 5x_3 &= 0, \\4x_1 - x_2 + x_3 &= 3, \\x_1 + 3x_2 - 13x_3 &= -6.\end{aligned}$$

(c)

$$\begin{aligned}x_1 + 3x_2 + 2x_3 &= 0, \\2x_1 - x_2 + 3x_3 &= 0, \\3x_1 - 5x_2 + 4x_3 &= 0, \\x_1 + 17x_2 + 4x_3 &= 0.\end{aligned}$$

2. For which λ the following system of equations has a solution:

$$\begin{aligned}2x_1 - x_2 + x_3 + x_4 &= 1, \\x_1 + 2x_2 - x_3 + 4x_4 &= 2, \\x_1 + 7x_2 - 4x_3 + 11x_4 &= \lambda.\end{aligned}$$