

Derek Haynes

Module 1 HW

Math 303

1.2.8

Find the General Solution

$$\begin{bmatrix} 1 & 4 & 0 & 7 \\ 2 & 7 & 0 & 10 \end{bmatrix}$$

Step 1 : Subtract 2*Row 1 from Row 2

Step 2: -1 * Row2

Step 3: Subtract 4 * Row 2 from Row 1

$$\begin{bmatrix} 1 & 0 & 0 & -9 \\ 0 & 1 & 0 & 4 \end{bmatrix}$$

Solution

$$x_1 = -9$$

$$x_2 = 4$$

$$x_3 = \textit{is free}$$

1.2.10

Given:

$$\begin{bmatrix} 1 & -2 & -1 & -3 \\ 3 & -6 & -2 & 2 \end{bmatrix}$$

Step 1: Add -3*Row 1 to Row 2 - thus replacing Row 2

Step 2: Add row 2 to row 1

$$\begin{bmatrix} 1 & -2 & 0 & -4 \\ 0 & 0 & 1 & -7 \end{bmatrix}$$

Solution:

$$\begin{cases} x_1 = -4 + 2x_2 \\ x_2 = \text{is free} \\ x_3 = -7 \end{cases}$$

1.2.14

Initial Augmented Matrix

$$\begin{bmatrix} 1 & 2 & -5 & -6 & 0 & -5 \\ 0 & 1 & -6 & -3 & 0 & 2 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Step 1: Add -2*(row 2) to row 1 to get

$$\begin{bmatrix} 1 & 0 & 7 & 0 & 0 & -9 \\ 0 & 1 & -6 & -3 & 0 & 2 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} x_1 + 7x_3 &= -9 \\ x_2 - 6x_3 - 3x_4 &= 2 \\ x_5 &= 0 \end{aligned}$$

Solution

$$\begin{cases} x_1 = -9 - 7x_3 \\ x_2 = 2 + 6x_3 + 3x_4 \\ x_3 = \text{is free} \\ x_4 = \text{is free} \\ x_5 = 0 \end{cases}$$

In []: