

Printout

Monday, November 18, 2024 11:31 AM

Section 1

MANE 3351

Lecture 22

Classroom Management

Agenda

- Return and Discuss Test 2
- Row Echelon Form
- Lab today

Resources

Handouts

- Lecture 22 slides
- Lecture 22 slides marked

Calendar

Date	Lecture Topic	Lab Topic
11/18	Lecture 22 - Row Echelon Form	Lab 10 - Row Echelon Form/Ch
11/20	Lecture 23 - Gaussian Elimination	
11/25		
11/27		
12/2		
12/4	Review	
12/9	Final exam 1:15 - 3:00 pm	

Assignments

Row Echelon Form

$$\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

- Augmented Matrix

- Row operations

- Any two rows can be interchanged
- The elements of any row can be multiplied by a nonzero real number
- Any row can be changed by adding or subtracting the corresponding elements with another row.

$$\frac{1}{3}R_1 \rightarrow \begin{bmatrix} 1 & 3 & 2 & 3 \\ 2 & 1 & 1 & 4 \end{bmatrix} \rightarrow \begin{array}{l} 1) \text{ all main diagonal} \\ \text{values are } 1 \\ 2) \text{ all values below} \\ \text{main diagonal} \\ \text{are } 0 \end{array}$$

Row Echelon Form Video

Example: 2 equations and 2 unknowns

Example: 3 equations and 3 unknowns

bbbbbb

$$\begin{bmatrix} 2 & -3 & 18 \\ 5 & 2 & 7 \end{bmatrix} \xrightarrow{\substack{\frac{1}{2}R_1 \\ -5R_1 + R_2}} \begin{bmatrix} 1 & -\frac{3}{2} & 9 \\ 5 & 2 & 7 \end{bmatrix}$$

$$\xrightarrow{\frac{2}{19}} \begin{bmatrix} 1 & -\frac{3}{2} & 9 \\ 0 & \frac{19}{2} & -38 \end{bmatrix}$$

$$\xrightarrow{\text{row 2} \times \frac{2}{19}} \begin{bmatrix} 1 & -\frac{3}{2} & 9 \\ 0 & 1 & -4 \end{bmatrix}$$

$$y = -4$$

$$x - \frac{3}{2}y = 9$$

$$x - \frac{3}{2}(-4) = 9$$

$$x + 6 = 9$$

$$x = 3$$

$$2x + 3y = 12$$

$$4x - 5y = -3$$

$$\xrightarrow{\frac{1}{2}R_1} \begin{bmatrix} 2 & 3 & 12 \\ 4 & -5 & -3 \end{bmatrix}$$

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$$\xrightarrow{-4R_1 + R_2} \begin{bmatrix} 1 & \frac{3}{2} & 6 \\ 4 & -5 & -3 \end{bmatrix}$$

$$\xrightarrow{-\frac{1}{11}R_2} \begin{bmatrix} 1 & \frac{3}{2} & 6 \\ 0 & -11 & -27 \end{bmatrix}$$

$$\begin{bmatrix} 1 & \frac{3}{2} & 6 \\ 0 & 1 & \frac{+27}{11} \end{bmatrix}$$

$$\begin{aligned} x + \frac{3}{2}y &= 6 \\ 0 + y &= \frac{27}{11} \end{aligned}$$

$$x + \frac{3}{2}\left(\frac{27}{11}\right) = 6$$

$$x + \frac{81}{22} = 6$$

$$x = 6 - \frac{81}{22} = 2.31818$$

$$x + 2y - z = 5$$

$$3x - y + 4z = 12$$

$$2x + y + 3z = 10$$

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$$\begin{array}{l} -3R_1 + R_2 \\ -2R_1 + R_3 \end{array} \left[\begin{array}{cccc} 1 & 2 & -1 & 5 \\ 3 & -1 & 4 & 12 \\ 2 & 1 & 3 & 10 \end{array} \right]$$

$$\left[\begin{array}{cccc} 3 & -1 & 4 & 12 \\ 1 & 2 & -1 & 5 \\ 2 & 1 & 3 & 10 \end{array} \right]$$

$$-\frac{1}{7}R_2 \left[\begin{array}{cccc} 1 & 2 & -1 & 5 \\ 0 & -7 & 7 & -3 \\ 0 & -3 & 5 & 0 \end{array} \right]$$

$$3R_2 + R_3 \left[\begin{array}{cccc} 1 & 2 & -1 & 5 \\ 0 & 1 & -1 & 3/7 \\ 0 & -3 & 5 & 0 \end{array} \right]$$

$$\frac{1}{2}R_3 \left[\begin{array}{cccc} 1 & 2 & -1 & 5 \\ 0 & 1 & -1 & 3/7 \\ 0 & 0 & 2 & 9/7 \end{array} \right]$$

$$\left[\begin{array}{cccc} 1 & 2 & -1 & 5 \\ 0 & 1 & -1 & 3/7 \\ 0 & 0 & 1 & 9/14 \end{array} \right]$$

$$\begin{array}{l} x + 2y - z = 5 \\ y - z = 3/7 \\ z = 9/14 \end{array}$$

$$y - (9/14) = 3/7$$

$$y = \frac{6}{14} + 9/14 = \frac{15}{14}$$

$$x + 2\left(\frac{15}{14}\right) - \frac{9}{14} = 5$$

$$x + \frac{21}{14} = 5$$

$$x = 5 - \frac{21}{14}$$

$$\begin{aligned}
 x &= 5 - \frac{21}{14} \\
 &= 3.5
 \end{aligned}$$

Test 2
22%

$$40 \rightarrow -60(.22) = -13.2$$