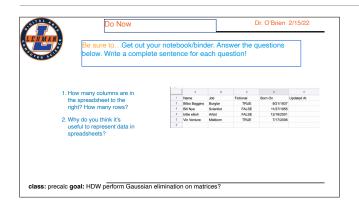
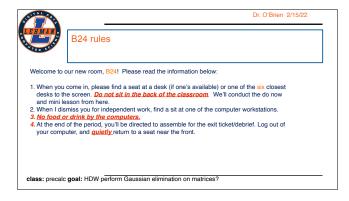


Fall 2021 Precalc Lesson 3.2

Dr. O'Brien Herbert H. Lehman High School 15 February 2022



- 1. 5 columns and 5 rows.
- 2. We can access data by row and column. Easier to represent and access data.









framing

- what: perform Gaussian elimination on matrices
- why: Matrices are a useful way to solve systems of equations
- where to: Review for Thursday quiz!

class: precalc goal: HDW perform Gaussian elimination on matrices?



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Matrices

An $m \times n$ matrix is an array with m rows and n columns:

where each entry $a_{i,j}$ is a real number.

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Matrix vocabulary

Coefficient matrix Matrix containing the coefficients from the left hand side of the system of equations

x - 4y + 3z = 5-x + 3y - z = -3 $\begin{array}{cccc} 2x & -4z = & 6 \end{array}$

Coefficient Matrix:

Augmented matrix

Matrix containing the coefficients from the left hand side of the system of equations and also

Augmented Matrix:

$$\begin{bmatrix} 1 & -4 & 3 & \vdots & \vdots \\ -1 & 3 & -1 & \vdots & -3 \\ 2 & 0 & -4 & \vdots & 0 \end{bmatrix}$$

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Augmented matrix

Write the augmented matrix for each system of equations:

$$\begin{cases} x + 3y = 9 \\ -y + 4z = -2 \\ y + 5z = 0 \end{cases}$$

b.
$$\begin{cases} x + 3y = 9 \\ -y + 4z = -2 \\ x - 5z = 0 \end{cases}$$

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Gaussian elimination on an augmented matrix

Convert the system below to augmented matrix form. Then perform Gaussian elimination.

$$\begin{cases} x - 2y + 3z = 9 \\ -x + 3y + z = -2 \\ 2x - 5y + 5z = 17 \end{cases}$$

$$2x - 5y + 5z = 17$$

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See pg. 507 textbook.



Independent work

1. Solve the nonsquare system below:

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

 $-4x + 9y = 7$

2. (a) convert the linear system below to an augmented matrix.

(b) Identify the dimensions of this matrix (c) Convert the matrix to row echelon form:

$$x + 2y + 3z = 4$$

 $-x - 2y + z = 5$
 $2x + 8y + z = -2$

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pivot: 2, elimination coefficient: -4, multiplier: 2

$$4x - 6y + 2z = -4$$

 $-4x + 9y$. = 7

$$3y. +2z = 3$$

$$y + 2/3 z = 1$$

$$y = 1 - 2/3z$$

$$4x - 6(1 - 2/3z) + 2z = -4$$

$$4x. -6 + 4z + 2z = -4$$

$$4x + 6z = 2$$

2x + 3z = 1

x = 0.5 - 1.5z

- z = a, where a is any real.
- 2. This system will appear to end up with a zero pivot in the second row, if students don't perform a row exchange (see ipad for detailed solution).

3.



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wrapping up!
be sure to: read the directions below!



- Make sure there isn't any litter near your workstation.
- If you borrowed headphones, sign them back in.
- Make sure you are logged out of your computer!
- Remain in your seat until the bell rings.

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