Week 13 Wednesday

November 28, 2018 1:28 PM

Quiz Wed 5th 16.2

Exam Wed Dec 12th 8:30am
CC124

2 changes to formula sheet

Trapezoidal Rule

$$\int_a^b f(x)dx \approx \frac{\Delta x}{2}\left[f(x_0)+\cdots\right]$$

Simpson's Rule

$$\int_a^b f(x)dx \approx \frac{\Delta x}{3}\left[f(x_0)+\cdots\right]$$

Remember $\Delta x = \frac{b-a}{n}$

Exam Breakdown
18 Q
75 Marks

Content	% of Marks
Derivatives	50
Integration	35
Matrices	15

16.3 Cont'd

Ex: $A = \begin{bmatrix} x & 4 \\ -2 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 7 \\ x \end{bmatrix}$ Find:

a) A^{-1}

$\det A = x \cdot 3 - (4)(-2)$

$= 3x + 8$

$A^{-1} = \frac{1}{3x+8} \begin{bmatrix} 3 & -4 \\ 2 & x \end{bmatrix}$

b) AB

$= \begin{bmatrix} x & 4 \\ -2 & 3 \end{bmatrix} \begin{bmatrix} 7 \\ x \end{bmatrix}$

$= \begin{bmatrix} 7x + 4x \\ -14 + 3x \end{bmatrix}$

$= \begin{bmatrix} 11x \\ -14 + 3x \end{bmatrix}$

16.4 Solving Systems Using A^{-1}

System of equations $\begin{cases} 2x + 3y = 4 \\ 5x + 6y = 7 \end{cases}$

Matrix equation $\begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 7 \end{bmatrix}$

Coefficients

Variables

\#

$AX = B$

★ A system of equations $AX=B$ has solution $X=A^{-1}B$ (if A^{-1} exists)

Why? $AX=B$

$A^{-1}AX=A^{-1}B$

$IX=A^{-1}B$

$X=A^{-1}B$

Ex: Solve using A^{-1}

$$\begin{cases} 7x-3y=25 \\ 2x+y=9 \end{cases}$$

$A=\begin{bmatrix} 7 & -3 \\ 2 & 1 \end{bmatrix}$ $\det A=13$

$A^{-1}=\frac{1}{13}\begin{bmatrix} 1 & 3 \\ -2 & 7 \end{bmatrix}$

$X=A^{-1}B$

$\begin{bmatrix} x \\ y \end{bmatrix}=\frac{1}{13}\begin{bmatrix} 1 & 3 \\ -2 & 7 \end{bmatrix}\begin{bmatrix} 25 \\ 9 \end{bmatrix}$

A^{-1}

$=\frac{1}{13}\begin{bmatrix} 52 \\ 13 \end{bmatrix}$

$=\begin{bmatrix} 4 \\ 1 \end{bmatrix}$

$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$

$x=4 \quad y=1$