GATE

DATA SCIENCE + CS & IT

Engineering Mathematics

DOUBT SESSION

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Topics to be covered

DOUBT SESSION

① n = no of points

$y = a + bx + cx^2$

$\Sigma y = na + b\Sigma x + c\Sigma x^2$

$\Sigma xy = a\Sigma x + b\Sigma x^2 + c\Sigma x^3$

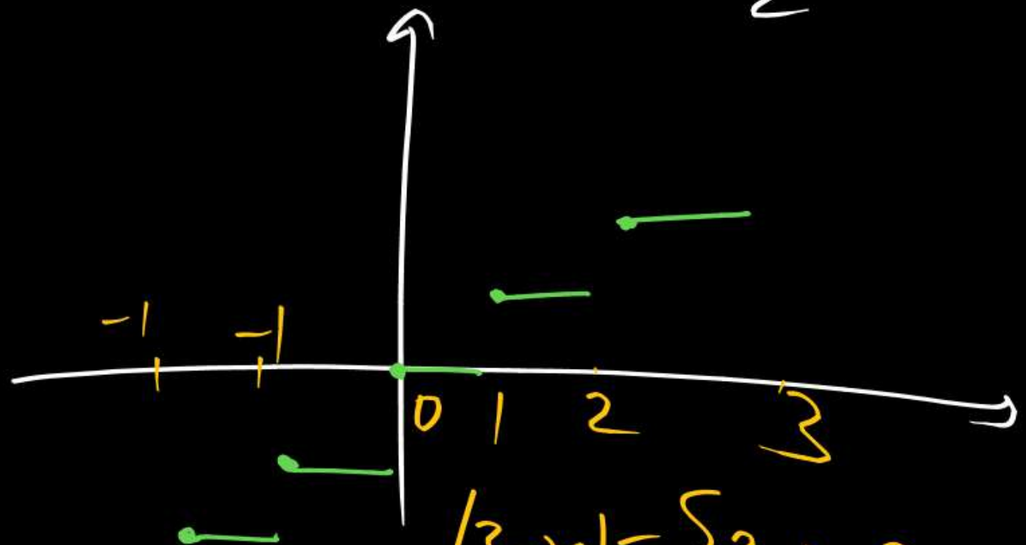
$\Sigma x^2 y = a\Sigma x^2 + b\Sigma x^3 + c\Sigma x^4$

② $P(4^{th}\ H \text{ in } 9^{th} \text{ toss}) = P(\text{exactly 3 H in } 1^{st} 8 \text{ toss}) \times P(H \text{ in } 9^{th})$

$= \left(\frac{{}^8C_3}{2^8}\right) \times \frac{1}{2} \times 1$

③ $\boxed{\dim(V_1 + V_2) = \dim(V_1) + \dim(V_2) - \dim(V_1 \cap V_2)}$

(4) $y=[x]=\begin{cases}-1, & -1\le x<0\\ 0, & 0\le x<1\\ 1, & 1\le x<2\\ 2, & 2\le x<3\end{cases}$



$y=[3+x]$

$0\le 3+x<1$

$-3\le x<-2$

$1\le 3+x<2$

$-2\le x<-1$

$2\le 3+x<3$

$-1\le x<0$

$-1\le 3+x<0$

$-4\le x<-3$

$|3-x|=\begin{cases}3-x, & 3-x\ge 0\\ -(3-x), & 3-x<0\end{cases}$

$y=\begin{cases}3-x, & x<3\\ x-3, & x\ge 3\end{cases}$

$y=\begin{cases}-1, & -4\le x<-3\\ (3-x)+0, & -3\le x<-2\\ (3-x)+1, & -2\le x<-1\\ (3-x)+2, & -1\le x<0\\ (3-x)+3, & 0\le x<1\end{cases}$

Calculus :-

	CS/IT	DA
Limit	✓	✓
Cont.	?	✓
TS/MS	✓	✓
LMVTh/RTh	✓	✓
Max-min (one Variable)	✓	✓
" " (two Variable)	✓	?
Partial Diff (Eulers Th)	✓	✓
Definite Int. (Property)	✓	?
D. Int.	✗	✓

(*) E Vectors of AA^T and A^TA are same or different.

Let $A_{2\times3}$ & $A^T_{3\times2}$ $\Rightarrow$ $(AA^T)_{2\times2}$, $(A^TA)_{3\times3}$

Non Zero E Values are generally same but EVectors not necessarily same

P&C and Prob

	CS/IT	DA
P & C	✓	✓
Ind Events	✓	✓
ME Events	or ✓	✓
Conditional Prob	✓	✓
Addition Th.	✓	✓
Bayes's Th.	✓	✓
Fundamental P	✓	✓

(Aptitude)

Stats	CS/IT	DA (100%)
Prob Dist (G.S)	✓	✓
Binomial	✓	✓
or	or	
Poisson	✓	✓
C.R.V (G.S)	✓	✓
U-Dist.	✓	✓
E. Dist.	?	?
N. Dist.	✓	✓
joint pmf/p.d.f	X	✓

	CS/IT	DA
Z test	✗	?
t-test	✗	✓
Ch-Sq-test	✗	✓✓
C.L.Th	?	?

L: Algebra	CS/IT	DA
① G. Prop of Det & Inverse	✓	✓
② Types of Matrices	✓	✓
③ Rank (Property Based)	✓	✓
④ Echelon forms	?	?
⑤ Non Homog Systems	?	?
⑥ Homog Systems (Nullity)	✓	✓
⑦ EValues & CHTh	✓	✓
⑧ EVectors & Diagonalisation	?	?
⑨ L-U Factorisation	?	?

Linear-2	CS/IT	DA
SVD	×	? (Lengthy Question)
QR Form	×	✓
Projection Mat	×	✓
Partition Mat	×	?
V. Space	?	✓ (Not sure to solve)

Let P be a projection matrix. Which of the following properties does not necessarily hold?

(a) P is idempotent. (T)

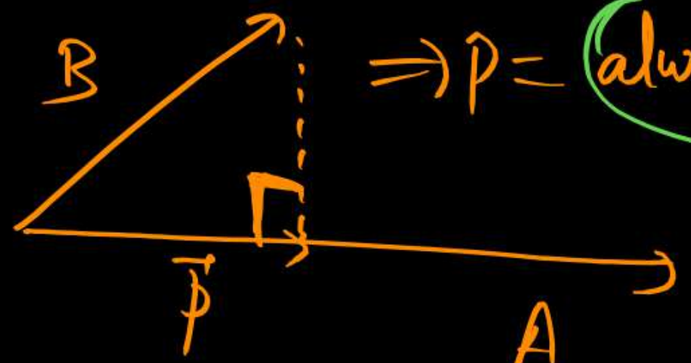
(b) The eigen values of P are either 0 or 1. (T)

(c) P is always diagonalizable. (T)

(d) P is always symmetric.

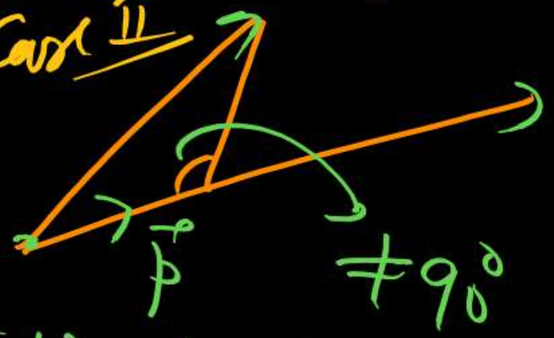
Projection Mat will be symm only for orthogonal projections.

Case I



$\Rightarrow P =$ always symm.

Case II



it is not orthogonal Projection

$P =$ Not Necessarily symm.

Telegram

Summary

Doubt Session

Thank
THANK
Keep Hustling!