SHUBHAM GUPTA

180729

Q2 P1

classmate
Date
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1) X_n denotes no. of consecutive heads or consecutive tails

X_{n+1} depends on X_n & $(n+1)^{st}$ toss alone $\therefore$ it is a MC

it is absorbing MC with HH, TTT as absorbing state
& from the transition probability table we can reach to these absorbing states via every possible road.

	HH	H	T	TT	TTT
HH	1	0	0	0	0
H	p.	0	1-p	0	0.
T	0	p	0	1-p	0
TT	0	p	0	0	1-p
TTT	0	0	0	0	1

~~⇒ expected no. of tosses until the exp ends~~

⇒ prob that the exp ends

$$u_{ij} = p_{ij} + \sum_{k \in A^c} p_{ik} u_{kj}.$$

solving it

$$\boxed{1-3p+3p^2-p^3}$$

expected no. of tosses:

$$v_i = 1 + \sum_{k \in A^c} p_{ik} V_k$$

Solving:

$$\cancel{\frac{1}{1-3p+3p^2-p^3}}$$

$$\boxed{\frac{1+2p-p^3+p}{1-3p+3p^2-p^3}}$$