Assignment 14-Probability and Random Variable

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Download latex code from here-

https://github.com/annu100/AI5002−Probability−and−Random−variables/tree/main.tex/ASSIGNMENT_114

I. Gate-24 Solution

A fair coin is tossed till a head appears for the first time. The probability that the number of requried tosses is odd,is .....

II. SOLUTIONS

As we know
For odd no of tosses
We can get number of tosses like this
1, 3 ,5,7.....
Then the probability for getting head for the first time is-

$$Pr(\text{Head 1st time}) = (1/2)^1 + (1/2)^3 + (1/2)^5 + (1/2)^7 \ldots \quad (1)$$

As we can see this is decreasing $G.P$ series
So sum ut upto infinity.
Sum is given by-
$S = \frac{a}{(1-r)}$ where. a is first term of the series=$\frac{1}{2}$
r is common. Ratio=$\frac{1}{4}$

$$Pr(\text{Head 1st time}) = \frac{1/2}{(1-1/4)} = \frac{2}{3} \quad (2)$$

So answer is 0.50/0.75
= 2/3