IME625: Introduction to Stochastic Processes
Quiz-2 Part-1, February 14, 2022
Duration: 5:15 to 5:30 pm **Maximum marks: 5**

Instructions: *Write your answer on white paper, take its photo at the end of this part of the exam (5:30 pm), create a pdf and submit it via mookit, which would accept submissions till 5:40 pm. In case you have difficulty accessing mookit, you shall email or whatsapp me the pdf. Don't use multiple channels for answer submission. Answers received after 5:40 pm will attract heavy penalty, and those received after 5:45 pm will not be considered for grading. Hand-written answers on digital writing pad will be accepted*.

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1. We are tossing a coin until we observe *two consecutive heads* or *three consecutive tails*, whichever happens earlier. Let $p \in (0,1)$ denote the probability of getting head in a toss. Determine the probability that the experiment ends with a tail. Obtain the expected number of tosses until the experiment ends. Both answers should be in terms of p. What value of p will make the experiment equally likely to end with a head or a tail? Approximate value (correct to the first digit after decimal point) is sufficient. First, model the experiment as an absorbing Markov chain, and then use the first-step analysis. [Marks: 1.5+1.25×2+1]