

## IME625: Introduction to Stochastic Processes

### Quiz-3 Part-2, March 09, 2022

**Duration: 5:45 to 6:00 pm**

**Maximum marks: 5**

Join zoom meeting (same as that of the class) with camera on.

Instructions: *Write your answer on white paper, take its photo at the end of this part of the exam (6:00 pm), create a pdf and submit it via mookit, which would accept submissions till 6:10 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 6:10 pm will attract heavy penalty, and those received after 6:15 pm will not be considered for grading. Hand-written answers on digital writing pad will be accepted.*

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2. Ever since the work-from-home started, the proportion of missed calls in my mobile phone has gone up significantly. I live in a duplex house, where my workspace is on the first floor and the living room, dining room, kitchen, etc. are on the ground floor. When I go from one floor to the other, sometimes, I forget to take the phone with me. In such a situation, if a call comes, I miss it. I want to find out the proportion of calls that I miss these days.

Consider 8 am to 10 pm every day to be the active hour for incoming calls, which come in a purely random manner with rate 1 per hour. During the active hour, I spend  $U(2,3)$  hour time at a stretch on the first floor before going to the ground floor for a break, which lasts for  $U(0.5,1)$  hour. If the phone is with me, I remember to carry it 60% of the times I go from first floor to the ground floor, and 70% of the times I go from ground floor to the first floor.

Answer the question with the above data. Ignore the inactive hour. Start with a Markov chain model. Remember that Markov chain is a discrete-time process, and the time here need not be clock time. My location as well as location of the phone are important. [Marks: 5]