IME625: Stochastic Processes

2021-22 Sem-II

Assignment-13

A taxi driver provides service in two zones of a city. Fares picked up in zone A will have destinations in zone A with probability 0.6 or in zone B with probability 0.4. Fares picked up in zone B will have destinations in zone A with probability 0.3 or in zone B with probability 0.7. The driver's expected profit for a trip entirely in zone A is 6; for a trip entirely in zone B is 8; and for a trip that involves both zones is 12. Find the taxi drivers average profit per trip.

Hint: *Let X_n denote the location of the taxi after the n-th trip. Let θ_A and θ_B denote expected profit from a trip starting in location A and B respectively. Then profit from the n-th trip is:* $\theta_A \mathbb{1}(X_{n-1} = A) + \theta_A \mathbb{1}(X_{n-1} = B)$. *We need to find its average for* $n = 1,2,3, \ldots$.