

Assignment 1

Group 1

November 22th, 2020

Problem 1

a)

Markov chain criteria:

1- The probability of being in a state only depends on the previous state.

2- It's a stochastic process.

X = The chain hits state j at time n

X_n is the scenario at time n

All states have finite expected return times and are communicated with each other, also the MC is irreducible, therefore its stationary distribution is **unique**.

b)

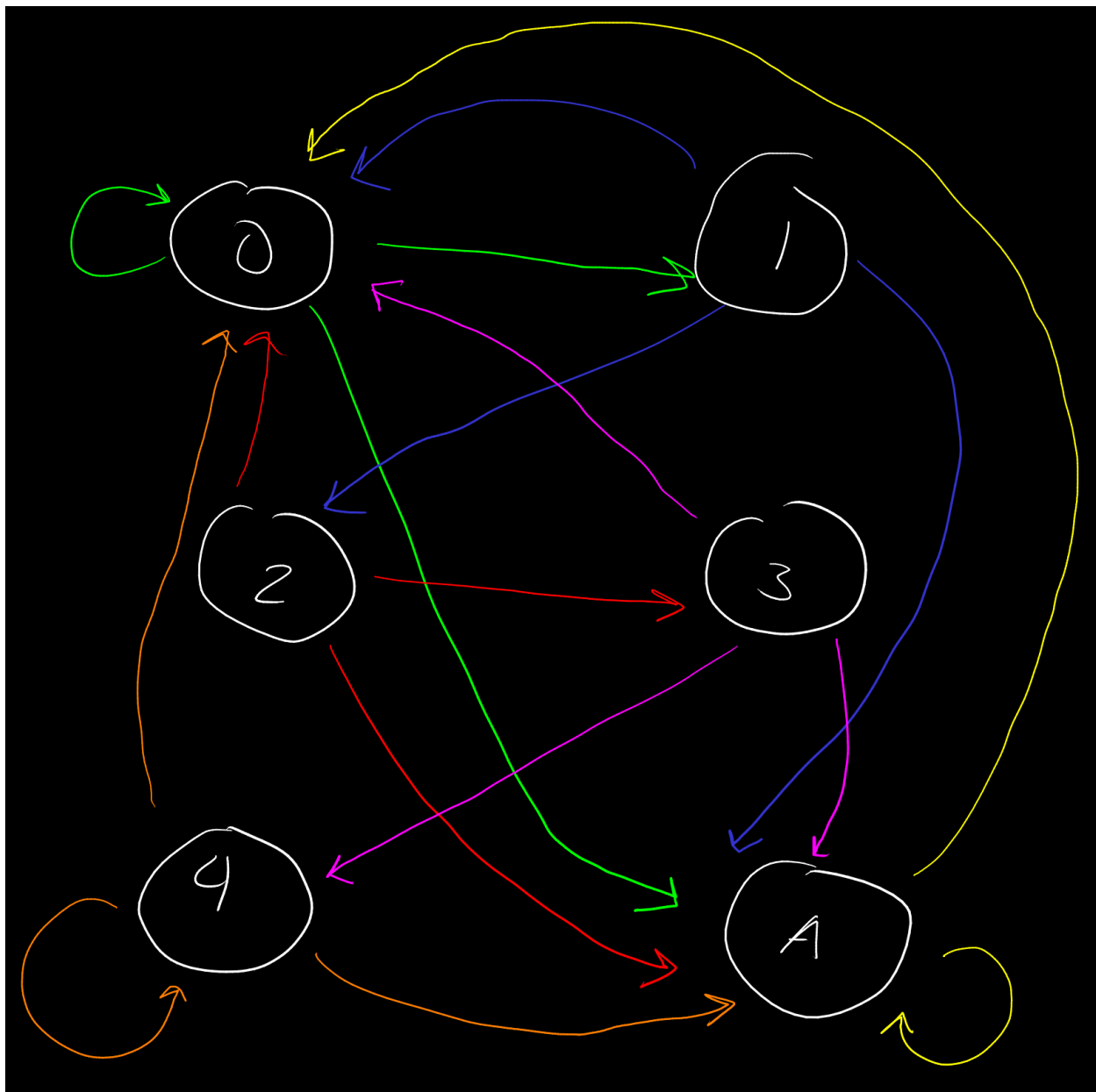


Figure 1: Graph for prob.1

Problem 2

a)

Because our MC is an irreducible infinite state MC, we have a unique stationary distribution π , $\pi_i = \frac{1}{\mu_i}$ and all states have expected finite return times then we have:

$$E[T_i | X_0 = i] = \mu_i = \frac{1}{\pi_i}$$