# Discrete Time Markov Chains

Compiled by D. Gueorguiev 4/21/2024

Introduction

**Definition**: *Discrete Time Markov Chain (DTMC)*

For a countable set , a discrete valued random sequence is called if for all , all states and any historical event the process satisfies the Markov property

The probability of a DTMC being in state at time from a state at time , is determined by the *transition probability* denoted by

The set is denoted as *the state space* of the Markov chain. The *transition probability matrix* at time is denoted by , such that . We observe that each row is the conditional distribution of given .