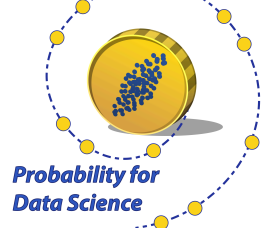


DATA 140



Spring 2025

WEEK 5 STUDY GUIDE

The Big Picture

You can think of a *stochastic process* as a random process indexed by time. A Markov chain is a stochastic process with a particular dependence structure that allows it to be used as a simple model in many settings.

- Under conditions that are pretty general, Markov chains run for a long time have powerful long-run properties.
- *Steady state* or *stationarity* has a physical interpretation and many uses.
- Many Markov chains, when run for a long time, exhibit different kinds of *balance*. These can be used to identify steady state properties.

Week At a Glance

Mon 2/17	Tue 2/18	Wed 2/19	Thu 2/20	Fri 2/21
Holiday: No Office Hours	Lecture	Sections (turned into OH 10AM - 4PM)	Lecture	Mega Sections
	Lab 3B Due at NOON		Office Hours 9AM - 12PM	
	HW 4 Due at NOON HW 5 (Due Mon 2/24)			HW 5 Party 2PM - 5PM
	Study for exam	Midterm 1	Work through Chapter 10	Work through Section 11.1.

Reading, Practice, and Live Sessions

Book	Topic	Lectures: Michael	Sections: GSIs	Optional Additional Practice
Ch 10	<p>Markov chains</p> <ul style="list-style-type: none"> - 10.1 introduces terminology, notation, and basics, along with a computational approach to the long run - 10.2 narrows down the type of chain we'll be studying, but even the narrowed-down group is large and interesting - 10.3 takes a more theoretical approach to the long run 	<p>Tuesday 2/18</p> <ul style="list-style-type: none"> - Introduction to Markov chains - Long run behavior 	<p>Wednesday 2/19</p> <ul style="list-style-type: none"> - Sections are converted into Office Hours for exam prep. 	<p>None.</p> <p>There are no exercises in Ch 10. All the Markov Chains exercises are in Ch 11, at which point you'll have techniques that make some of the solutions easier.</p>
Ch 11	<p>Balance and detailed balance</p> <ul style="list-style-type: none"> - 10.3 takes a more theoretical approach to the long run - 11.1 is about different kinds of balance, and how one of them can make it easy to identify the other 	<p>Thursday 2/20</p> <ul style="list-style-type: none"> - Different kinds of balance - Spotting the one that makes calculations easy 	<p>Friday 2/21</p> <ul style="list-style-type: none"> - Ch 11 Ex 1, 3, 4, 5 	<p>Chapter 11 Ex 2</p> <p>The Konstantopoulos exercises listed after Ex 5 come with complete solutions.</p>