

Homework # 6: Markov Chains: Long Run Behavior and Exits

Due: April 27, 11:30 am

1. Find the stationary distributions for the Markov chains with transition matrices:

(a)	1	2	3	(b)	1	2	3
1	0.5	0.4	0.1	1	0.6	0.4	0.0
2	0.2	0.5	0.3	2	0.2	0.4	0.2
3	0.1	0.3	0.6	3	0.0	0.2	0.8

2. Consider the Markov chain with transition matrix:

	1	2	3	4
1	0.0	0.0	0.1	0.9
2	0.0	0.0	0.6	0.4
3	0.8	0.2	0.0	0.0
4	0.4	0.6	0.0	0.0

- (a) Compute p^2 .
- (b) Find the stationary distributions of p and all of the stationary distributions of p^2 .
- (c) Find the limit of $p^{2n}(x, x)$ as $n \rightarrow \infty$.
3. Do the following Markov chains converge to equilibrium?
Hint: Check if they are irreducible, aperiodic, have a stationary distribution.

(a)	1	2	3	4	(b)	1	2	3	4
1	0.0	0.0	1.0	0.0	1	0.0	1.0	0.0	0.0
2	0.0	0.0	0.5	0.5	2	0.0	0.0	0.0	1.0
3	0.3	0.7	0.0	0.0	3	1.0	0.0	0.0	0.0
4	1.0	0.0	0.0	0.0	4	1/3	0.0	2/3	0.0

4. **Reflection** How long did this assignment take you (be honest)? Do you feel that this is too short or long? How is the material going? How can I help you?