Dr. Cristian Giardinà 11 September 2008

Stochastic Processes 2WB08 problem set 2

- Problem 6.8, 6.9.
- Problem: Let $(X_n)_{n\in\mathbb{N}_0}$ be a Markov chain with finite state space S and transition matrix p. Let $g : S \to \mathbb{R}$ be a function with the following property: there exists $\lambda > 0$ such that for all $i \in S$ the inequality
$$\sum_{j\in S} p(i,j)g(j) \leq \lambda g(i)$$
holds. Prove that $(\lambda^{-n} g(X_n))_{n\geq 0}$ is a supermartingale.
- Read Section 6.3 in Ross.
- Problems 6.15, 6.16, 6.17, 6.18, 6.19, 6.20, 6.21.