MARKOV CHAINS

Discrete-time chains

Definition and basic propteries, the transition matrix. Calculation of n-step transition probabilities. Communicating classes, closed classes, absorption, irreducibility. Calculation of hitting probabilities and mean hitting times; survival probability of birth and death chains. Stopping times and statement of the strong Markov property.

Recurrence and transience; equivalence of ~~transie~~ transience and summability of n-step transition probabilites, equivalence of recurrence and certainty of returns.
Recurrence as a class proptery, relation with closed classes.
Simple random walks in dimensions one, two and three

Invariant distributions, statement of existence and uniqueness. Mean return time, positive recurrence; equivalence of positive recurrence and the existence of an invariant distribution. Convergence to equilibrium, positive recurrent, aperiodic chains and proof by coupling. *Long-run proportion of time spent in given state*.

Appropiate Books

(OUP 2001)

G.R Grimmett and D.R Stirzaker Probability and Random Processes

G.R Grimmett and D Welsh Probability, An Introduction OUP, 2nd edition, 2014

J.R Norris Markov Chains CUP 1997