
Contents

<i>Preface</i>	7
<i>Notation</i>	11
1 Introduction	1
1.1 Markov chains and martingales: basic definitions and facts	2
2 Recurrence of two-dimensional simple random walk	8
2.1 Classical proof	8
2.2 Electrical networks	11
2.3 Lyapunov functions	16
2.4 Exercises	27
3 Some potential theory for simple random walks	33
3.1 Transient case	34
3.2 Potential theory in two dimensions	45
3.3 Exercises	65
4 SRW conditioned on not hitting the origin	73
4.1 Doob's h -transforms	73
4.2 Conditioned SRW in two dimensions: basic properties	78
4.3 Green's function and capacity	81
4.4 Harmonic measure	92
4.5 Range of the conditioned SRW	100
4.6 Exercises	111
5 Intermezzo: soft local times and Poisson processes of objects	115
5.1 Soft local times	115
5.2 Poisson processes of objects	131
5.3 Exercises	137
6 Random interlacements	142
6.1 Random interlacements in higher dimensions	142

6	<i>Contents</i>	
6.2	The two-dimensional case	159
6.3	Proofs for two-dimensional random interlacements	168
6.4	Exercises	182
	<i>Hints and solutions to selected exercises</i>	185
	<i>References</i>	201
	<i>Index</i>	208