

Contents

Preface.....	v
List of Contributors	vii
1. Use of exchangeable pairs in the analysis of simulations	
<i>Charles Stein, Persi Diaconis, Susan Holmes and Gesine Reinert</i>	
1.1 Introduction	1
1.2 Exchangeable pairs	2
1.2.1 Definitions.....	2
1.2.2 Reversible Markov chains	3
1.3 First examples	5
1.3.1 Transition matrix Monte Carlo.....	6
1.3.2 A Poisson–Binomial example.....	7
1.3.3 Another example: The Ising model.....	11
1.4 Exchangeable pairs as auxiliary variates.....	12
1.4.1 Basic formulae.....	12
1.5 Distributional approximations.....	16
2. Stein’s method for Markov chains: first examples	
<i>Persi Diaconis</i>	
2.1 Introduction	26
2.2 Convergence to the uniform distribution for simple random walk	27
2.3 An extension to general measures	31
2.4 The Ehrenfest Urn.....	35
2.5 A Fourier connection.....	38
3. Stein’s method for birth and death chains	
<i>Susan Holmes</i>	
3.1 Overview	42
3.2 Examples	43
3.2.1 Bounds on the distance between Poisson and binomial ..	43
3.2.2 Hypergeometric and binomial	45
3.3 Notation and context	47
3.3.1 Exchangeable variables.....	47
3.3.2 Operators of antisymmetric functions	47
3.3.3 A characterizing operator for the target distribution	48
3.3.4 A useful diagram.....	48
3.4 Birth and death chains.....	49
3.4.1 Exchangeable pairs	49
3.4.2 A generalization of Todhunter’s formula	50
3.4.3 Characterizing operators	52
3.4.4 Examples	53
3.5 General discrete target distribution	58
3.6 Appendix: Some numbers	61
4. Stein’s method and non-reversible Markov chains	
<i>Jason Fulman</i>	
4.1 Introduction	66
4.2 Construction of an exchangeable pair (W, W')	68
4.3 Bounding the error terms	71