Contents

Preface —— v	Pre	fac	e		٧
--------------	-----	-----	---	--	---

1	Multivariate modulated Markov log-price processes (LPP) —— 1
1.1	Markov LPP —— 1
1.2	LPP represented by random walks —— 8
1.3	Autoregressive LPP —— 18
1.4	Autoregressive stochastic volatility LPP —— 28
2	American-type options —— 44
2.1	American-type options —— 44
2.2	Pay-off functions —— 47
2.3	Reward and log-reward functions —— 53
2.4	Optimal stopping times —— 63
2.5	American-type knockout options —— 72
3	Backward recurrence reward algorithms —— 76
3.1	Binomial tree reward algorithms —— 76
3.2	Trinomial tree reward algorithms —— 88
3.3	Random walk reward algorithms —— 100
3.4	Markov chain reward algorithms —— 106
4	Upper bounds for option rewards —— 115
4.1	Markov LPP with bounded characteristics —— 115
4.2	LPP represented by random walks —— 127
4.3	Markov LPP with unbounded characteristics —— 133
4.4	Univariate Markov Gaussian LPP —— 154
4.5	Multivariate modulated Markov Gaussian LPP —— 159
5	Convergence of option rewards – I —— 167
5.1	Asymptotically uniform upper bounds for rewards – I —— 168
5.2	Modulated Markov LPP with bounded characteristics —— 180
5.3	LPP represented by modulated random walks —— 194
6	Convergence of option rewards – II —— 203
6.1	Asymptotically uniform upper bounds for rewards – II —— 204
6.2	Univariate modulated LPP with unbounded characteristics —— 214
6.3	Asymptotically uniform upper bounds for rewards – III —— 220
6.4	Multivariate modulated LPP with unbounded characteristics —— 231
6.5	Conditions of convergence for Markov price processes —— 238

7	Space-skeleton reward approximations —— 241
7.1	Atomic approximation models —— 242
7.2	Univariate Markov LPP with bounded characteristics —— 251
7.3	Multivariate Markov LPP with bounded characteristics —— 262
7.4	LPP represented by multivariate modulated random walks —— 275
7.5	Multivariate Markov LPP with unbounded characteristics —— 294
8	Convergence of rewards for Markov Gaussian LPP —— 303
8.1	Univariate Markov Gaussian LPP —— 303
8.2	Multivariate modulated Markov Gaussian LPP —— 312
8.3	Markov Gaussian LPP with estimated characteristics —— 321
8.4	Skeleton reward approximations for Markov Gaussian LPP —— 335
8.5	LPP represented by Gaussian random walks —— 347
9	Tree-type approximations for Markov Gaussian LPP 357
9.1	Univariate binomial tree approximations —— 358
9.2	Multivariate binomial tree approximations —— 367
9.3	Multivariate trinomial tree approximations —— 379
9.4	Inhomogeneous in space binomial approximations —— 394
9.5	Inhomogeneous in time and space trinomial approximations —— 398
10	Convergence of tree-type reward approximations —— 413
10.1	Univariate binomial tree approximation models —— 413
10.2	Multivariate homogeneous in space tree models —— 424
10.3	Univariate inhomogeneous in space tree models —— 441
10.4	Multivariate inhomogeneous in space tree models —— 456
Bibliog	raphical Remarks —— 465
Bibliog	raphy —— 475
Index -	501