

Contents

Part I Two-Dimensional Traffic Models of Integrated Voice/Data Cellular Wireless Networks	
1 Performance Analysis of Multi-Parametric Call Admission Control (CAC) Strategies in Unbuffered Cellular Wireless Networks	3
1.1 CAC Based on the Guard Channels Strategy	3
1.2 CAC Based on a Cutoff Strategy	12
1.3 Numerical Results	19
1.4 Conclusion	28
References	29
2 Performance Analysis of Call-Handling Processes in Buffered Cellular Wireless Networks	31
2.1 Models with Queues for h-Calls	31
2.1.1 Models with Finite Queues	32
2.1.2 Models with Infinite Queues	39
2.1.3 Numerical Results	44
2.2 Models with Queues for o-Calls	49
2.2.1 Models Without Reassignment of Channels	50
2.2.2 Models with Reassignment of Channels	54
2.2.3 Numerical Results	66
2.3 Conclusion	75
References	76
3 QoS Optimization Problems in Cellular Wireless Networks	77
3.1 QoS Optimization Problems in Cells Without Queues	77
3.1.1 Optimization of Models with Guard Channels for Handover Calls	77
3.1.2 Optimization of Models with Individual Channels for Handover Calls	80
3.2 QoS Optimization Problems in Cells with Queues	84
3.2.1 QoS Optimization Problems in Cells with a Limited Queue of h-Calls	84

3.2.2 QoS Optimization Problems in Cells with an Unlimited Queue of h-Calls	88
3.3 Conclusion	90
References	91

Part II Multi-Dimensional Models of Multi-Service Networks

4 Models of Multi-Rate Systems with Inelastic Calls	95
4.1 General Models of Unbuffered Multi-Rate Systems	95
4.1.1 Complete Sharing Strategy	96
4.1.2 Complete Sharing with Equalization Strategy	100
4.1.3 Trunk Reservation Strategy	102
4.1.4 Numerical Results	105
4.2 Gimpelson-Type Multi-Rate Systems	116
4.2.1 Unbuffered Models with a Special Group of Channels for Wide-Band Calls	116
4.2.2 Models with Guard Channels and Buffers for Wide-Band Calls	119
4.2.3 Numerical Results	123
4.3 Conclusion	128
References	129
5 Models of Mixed Multi-Rate Systems	131
5.1 Unbuffered Models	131
5.1.1 Models with a Continuous Band	132
5.1.2 Models with a Discrete Band	136
5.2 Models with Buffers for Elastic Calls	138
5.3 Numerical Results	143
5.4 Conclusion	146
References	148
6 Parametric Optimization Problems in Multi-Rate Systems	149
6.1 Problems for Unbuffered Gimpelson's Models	149
6.1.1 Problem of Equivalent Capacity with the CS-Strategy	150
6.1.2 Problems of Finding the Optimal CAC Parameters with the TR-Strategy	151
6.1.3 Problems of Finding the Optimal CAC Parameters with the SGC-Strategy	158
6.2 Problems for Buffered Gimpelson's Models	160
6.3 Problems for Mixed Models	162
6.4 Conclusion	164
References	165
7 Markov Decision Processes (MDP) Approach to Optimization Problems for Multi-Rate Systems	167
7.1 Hierarchical Phase-Merging Algorithm for MDP Problems	167
7.2 Finding the Optimal Access Strategy	173

7.3	Finding the Sub-Optimal Access Strategy	181
7.4	Numerical Results	184
7.5	Conclusion	185
	References	186
Appendix	187
	References	190
Index	191



<http://www.springer.com/978-3-642-15457-7>

Performance Analysis and Optimization of Multi-Traffic
on Communication Networks

Ponomarenko, L.; Kim, C.S.; Melikov, A.

2010, XIV, 194 p., Hardcover

ISBN: 978-3-642-15457-7