

Contents

Acknowledgements	iii
1 Introduction	1
1.1 Overview	1
1.2 Outline and Scope	2
2 Technical Background	5
2.1 Cooperative Communication	5
2.2 Fifth Generation of Mobile Communication	6
2.3 C-RAN	7
2.4 Fundamentals of Optimization	8
2.5 Notations	9
3 Virtual Cell Association and Resource Optimization	11
3.1 Overview	11
3.1.1 Related works	12
3.1.2 Contributions and Outline	13
3.2 System Model	14
3.2.1 Fixed Fronthaul Model	14
3.2.2 Problem Formulation	15
3.3 Iterative MIQP Framework	16
3.3.1 First Order Approximation	16
3.4 Joint Association and Robust Precoding with RRH Mode Switching	18
3.4.1 RRH Power Model	18
3.4.2 Wireless Fronthaul Model	19
3.4.3 Robust Optimization Framework	20
3.5 Simulation Results & Discussion	22
3.6 Summary	28
4 Low Complexity Virtual Cell Association & Resource Allocation	31
4.1 Overview	31
4.1.1 Related works	31
4.1.2 Contributions and Outline	32
4.2 System Model	32
4.2.1 Fronthaul Power Model	33

4.2.2	Problem Formulation	34
4.3	PDD-based Association & Precoder (PAP) Design	34
4.3.1	Problem Transformation	35
4.3.2	General PDD Method	35
4.3.3	PAP Algorithm	36
4.4	Hybrid Association	38
4.5	Sparse Precoding Algorithm	41
4.6	Association and Resource Allocation in MIMO	42
4.6.1	WMMSE MIMO Multi-stream Precoding	42
4.6.2	Block Coordinate Descent Algorithm	43
4.7	Simulation Results	46
4.8	Summary	50
5	Optimization of Cloud and Mobile edge computing	55
5.1	Overview	55
5.1.1	Related Works	55
5.1.2	Contributions and Outline	56
5.2	System Model	56
5.3	Joint package and processing resource allocation	60
5.4	Simulation Results & Discussion	60
5.5	Summary	64
6	Optimization of Unmanned Aerial Vehicle Augmented C-RAN	65
6.1	Overview	65
6.1.1	Related Works	65
6.1.2	Contributions and Outline	67
6.2	System Model	67
6.3	Problem Formulation	71
6.4	Quantized MILP Optimization	72
6.5	Particle Swarm Optimization	73
6.5.1	Complexity Analysis	74
6.6	Simulation Results & Discussion	74
6.7	Summary	79
7	Conclusions	83
7.1	Summary	83
7.2	Outlook	84
	List of Acronyms	87
	List of Symbols and Notation	91
	List of Publications	97
	Bibliography	99