

Contents

1	Introduction	1
1.1	5G Demands and Challenges	1
1.2	Introduction of Index Modulation Family	3
1.2.1	Space Domain Index Modulation Overview	3
1.2.2	Space-Time Domain Index Modulation Overview	5
1.2.3	Frequency Domain Index Modulation Overview	6
1.3	Organization of the Monograph	9
	References	9
2	Space Domain Index Modulation	13
2.1	Spatial Modulation	13
2.1.1	System Model	13
2.1.2	Low-Complexity Detection	14
2.1.3	Performance Evaluation	17
2.2	Pre-coding Aided Spatial Modulation	17
2.2.1	System Model	19
2.2.2	Average Bit Error Probability Analysis	22
2.2.3	Performance Evaluation	25
2.3	Virtual Spatial Modulation	26
2.3.1	System Model	28
2.3.2	Average Bit Error Probability Analysis	31
2.3.3	Performance Evaluation	35
2.4	Applications to Cooperative Communications	39
2.4.1	System Model	40
2.4.2	ABEP Analysis and Power Allocation	42
2.4.3	Performance Evaluation	47
2.5	Summary	50
	References	50

3	Space-Time Domain Index Modulation	53
3.1	Differential Spatial Modulation	53
3.1.1	Transceiver Structure	53
3.1.2	Average Bit Error Probability Analysis	60
3.1.3	Performance Evaluation	64
3.2	Design Guidelines for Differential Spatial Modulation	67
3.2.1	Low-Complexity Near-ML Receiver	67
3.2.2	Gray Coding for Antenna Activation Orders	72
3.2.3	Diversity Enhancing Scheme	76
3.3	Precoding Aided Differential Spatial Modulation	78
3.3.1	Transceiver Structure	78
3.3.2	ABEP Upper Bound Analysis	80
3.3.3	Performance Evaluation	84
3.4	Applications to Cooperative Communications	87
3.4.1	System Model	87
3.4.2	ABEP Upper Bound Analysis	92
3.4.3	Performance Evaluation	98
3.5	Summary	102
	References	102
4	Frequency Domain Index Modulation	103
4.1	OFDM with Index Modulation	103
4.1.1	Transceiver Structure	103
4.1.2	Achievable Rate Analysis	107
4.1.3	Performance Evaluation	117
4.2	Design Guidelines for Performance Improvement	121
4.2.1	Interleaved Grouping	122
4.2.2	Equiprobable Subcarrier Activation	127
4.2.3	Hybrid Index Modulation	133
4.2.4	In-phase/Quadrature Index Modulation	135
4.3	Applications to High-Mobility Communications	139
4.3.1	OFDM-IM with ICI Self-Cancellation	139
4.3.2	Performance Evaluation	145
4.4	Summary	148
	References	148
5	Conclusions and Future Directions	151
5.1	Conclusions	151
5.2	Future Directions	153

Index Modulation for 5G Wireless Communications

Wen, M.; Cheng, X.; Yang, L.

2017, X, 154 p. 56 illus., Hardcover

ISBN: 978-3-319-51354-6