



**Spatial Modulation Enhancement Using Non-Orthogonal Multiple Access, Codebook-based Precoding and New Single RF Models**

by

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## TABLE OF CONTENTS

	<b>PAGE</b>
<b>ACKNOWLEDGEMENT</b>	<b>ii</b>
<b>TABLE OF CONTENTS</b>	<b>iii</b>
<b>LIST OF TABLES</b>	<b>viii</b>
<b>LIST OF FIGURES</b>	<b>xi</b>
<b>LIST OF ABBREVIATIONS</b>	<b>xx</b>
<b>LIST OF Symbols</b>	<b>xxv</b>
<b>ABSTRAK</b>	<b>xxviii</b>
<b>ABSTRACT</b>	<b>xxix</b>
<b>CHAPTER 1 : INTRODUCTION</b>	<b>1</b>
1.1 Research Background	1
1.2 Problem Statements	5
1.3 Research Objectives	9
1.4 Research Contributions	9
1.5 Scope of Research	11
1.6 Thesis Outline	12
<b>CHAPTER 2 : LITERATURE REVIEW</b>	<b>14</b>
2.1 Introduction	14
2.2 Fifth Generation Cellular Networks	14
2.2.1 Enhanced Mobile Broadband (eMBB)	15
2.2.2 Massive Machine Type Communication (mMTC)	16

2.2.3	Ultra-Reliable Low Latency Communication (URLLC)	18
2.3	Non-Orthogonal Multiple Access (NOMA) Technology	19
2.3.1	Orthogonal Multiple Access (OMA)	19
2.3.2	Power Domain NOMA Concept	20
2.4	Spatial Modulation (SM) Technology	22
2.4.1	Conventional MIMO Techniques	22
2.4.2	SM Transmitter and Receiver	31
2.4.3	Space Shift Keying (SSK)	34
2.4.4	SM/SSK Advantages and Disadvantages	36
2.5	BER Performance Limitation of SM Technology	39
2.5.1	Transmit Precoding (TP) Techniques	44
2.5.1.1	Non-Codebook-based Precoding ( <i>NCP</i> ) Approach	45
2.5.1.2	Codebook-based Precoding ( <i>CP</i> ) Approach	47
2.5.1.3	Hybrid-CP Approach	50
2.5.1.4	Comparison between TP Approaches	51
2.6	Spectral Efficiency (SE) Limitation of SM Technology	53
2.6.1	NOMA-SM Combination System Models	56
2.6.1.1	Multi-RF (MRF) NOMA-SM model	57
2.6.1.2	Single-RF (SRF) NOMA-SM Models	59
2.6.1.3	Comparison between MRF and SRF Models	63
2.7	Summary	64
	<b>CHAPTER 3 :        METHODOLOGY</b>	<b>66</b>
3.1	Introduction	66
3.2	BER Performance Enhancement Technique for SSK System	67
3.2.1	Introduction	67

3.2.2	SSK System Model for Codebook-based Precoding	70
3.2.3	BER Analysis of Conventional SSK System	72
3.2.4	Codeword Selection Criteria for Codebook-based Precoding	76
3.2.4.1	Instantaneous CSI-based CWS Criterion	76
3.2.4.2	Long-Term Characteristics of CSI CWS Criterion	79
3.3	BER Enhancement through Codebook-based Precoding	83
3.3.1	Full-Combinations (FC) Codebook	84
3.3.2	Low Complexity Forms of FC Codebook	87
3.3.2.1	Iterative Search (IS) Algorithm for FC codebook	88
3.3.2.2	Factorized Full-Combinations (FFC) Codebook	91
3.3.2.3	Statistically Filtered Full-Combination (SFF) Codebooks	95
3.3.3	Orthogonal Codebooks-based Phase Rotation Precoding	100
3.3.3.1	Walsh-Hadamard (WH) Codebook	100
3.3.3.2	Quasi-Orthogonal Sequences (QOS) Codebook	101
3.3.3.3	Orthogonal Array Testing (OAT) Codebook	103
3.3.4	Complexity Comparison of the Proposed Codebooks	106
3.4	NOMA-based Spectral Efficiency Enhancement	109
3.4.1	Introduction	109
3.4.2	NOMA-SM System Models	112
3.4.3	Multi-RF (MRF)-NOMA-SM Transmitter and Receiver Model	113
3.4.4	Single-RF Generalized (SRFGen) NOMA-SM Model	119
3.5	SRFGen Special Cases	123
3.5.1	SRF Case 1- <i>Unshared</i> AS bits ( <i>SRFC1</i> ):	123
3.5.2	SRF Case 2 with $L$ SSK Users ( <i>SRFC2-L</i> ):	124
3.5.3	Comparison between the SRF Models	128
3.5.4	Low Complexity Detector at SSK Receivers: Next SM Signal Detector	129

3.6	Equal-Signal to Interference plus Noise Ratio-Power Allocation Method	130
3.7	Spectral Efficiency (SE) Analysis for NOMA-SM Systems	132
3.7.1	SE Analysis of MRF-NOMA-SM Systems	133
3.7.1.1	SE Analysis for MRF Model with Gaussian Inputs	134
3.7.1.2	SE Analysis for MRF Model with Finite-Alphabet Inputs	137
3.7.2	SE Analysis of SRFGGen-NOMA-SM Systems	139
3.7.2.1	SE Analysis for SRFGGen-NOMA-SM with Gaussian Inputs	141
3.7.2.2	SE Analysis for SRFGGen-NOMA-SM with FA Inputs	143
3.8	Summary	144
<b>CHAPTER 4 : RESULTS &amp; DISCUSSION</b>		<b>146</b>
4.1	Introduction	146
4.2	Evaluation of Single-User SSK System	148
4.2.1	BER of Conventional SSK without Precoding	149
4.2.2	BER of SSK System with FC Codebook-based Precoding	151
4.2.3	BER of Low Complexity Forms of FC Codebooks	157
4.2.4	BER Comparison of Orthogonal Codebooks	163
4.2.5	Effect of Transmit Antenna Correlation	166
4.2.6	BER Comparison of Codeword Selection (CWS) Criteria	168
4.2.7	Influence of Imperfect Channel State Information Estimation	171
4.2.8	BER under Nakagami-m Fading Channels	173
4.2.9	Computational Complexity of the Proposed Codebooks	174
4.3	Evaluation of Multi-User SM/SSK Systems	187
4.3.1	Spectral Efficiency (SE) Evaluation of NOMA-SM/SSK Systems	189
4.3.1.1	MI Performance of MRF Model for Gaussian and FA Inputs	190
4.3.1.2	MI Performance of SRFGGen Model for Gaussian and FA Inputs	194

4.3.1.3	Sum-Rate Comparison of NOMA-SM/SSK Models	197
4.3.1.4	Users' Rates and Sum-Rate with Equal TRs	204
4.3.1.5	Impact of Sharing Spatial Bits given Sum of TRs Equality	208
4.3.1.6	Ergodic Capacity Comparison of NOMA-SM Models	217
4.3.2	Energy Efficiency (EE) Evaluation of NOMA-SM Models	223
4.3.3	SE and BER of NOMA-SM/SSK Models for ESINR-PA Method	226
4.3.4	BER Evaluation of NOMA-SM/SSK Systems	230
4.3.4.1	Impact of Sharing Spatial Bits given Sum of TRs Equality	237
4.3.4.2	Effect of Antenna Correlation on the BER of NOMA-SM/SSK	238
4.3.5	Overall comparisons of NOMA-SM Models	241
4.4	Summary	245
<b>CHAPTER 5 : CONCLUSION</b>		<b>248</b>
5.1	Conclusions	248
5.2	Recommendations for Future Works	253
<b>REFERENCES</b>		<b>255</b>
<b>APPENDIX A: Examples of FC and OAT Codebooks</b>		<b>271</b>
<b>APPENDIX B: Example of joint TA selection in the SRFGen model</b>		<b>275</b>
<b>LIST OF PUBLICATIONS</b>		<b>276</b>

## LIST OF TABLES

		PAGE
Table 2.1	Examples of antenna and symbol mappings.	33
Table 2.2	Examples of selected SM transmission blocks and transmitted vectors for $Nt = 4, M = 4$ (QPSK) among 16 combinations.	33
Table 2.3	Selected publications in SM area.	37
Table 2.4	List of contributions in the TP literature.	45
Table 2.5	Advantages and disadvantages of the existing <i>NCP</i> , <i>CP</i> , and <i>HCP</i> approaches.	53
Table 2.6	Summary of existing contributions for MRF Model	58
Table 2.7	Summary of the proposals on SRF models	62
Table 3.1	An example of FC codebooks when $\phi = 2$ , and $N_t = 4$ .	85
Table 3.2	Example of FFC Codebook ( $\mathbf{C}_{FFC}$ ) when $N_t = 4$ and $\phi = 4$ .	92
Table 3.3	Example of FFC Codebook when $N_t = 4$ and $\phi = 8$ phases.	93
Table 3.4	An example of the Walsh codebook for $N_t = 8, \phi = 2$ .	101
Table 3.5	An example of QOS codebook for $N_t = 4$ , and $\phi = 4$ .	102
Table 3.6	An example of OAT codebook for $N_t = 4, \phi = 2(L_8(2^4))$ .	105
Table 3.7	Codebook sizes and the number of feedback bits comparison between proposed codebooks, DFT codebook, and MMD iterative algorithm.	108

Table 3.8	Possible indices of antennas and modulation symbols for the MRF-NOMA-SM model when $N_t = 8$ , and $M_k = 4$ (QPSK).	115
Table 3.9	TA and symbol modulation mapping results for three users at two transmission instants in the MRF-NOMA-SM model.	115
Table 3.10	TA and symbol modulation mapping results for three users at three transmission instants for the SRFGen-NOMA-SM model.	121
Table 3.11	SRFGen and its special cases based on AS and SS bits.	126
Table 3.12	Example of distributing AS and SS bits in the SRFGen and its special cases; $K = 4, N_t = 16, M_k = 3, 8$ PSK, $k = 1, 2, 3, 4$ .	126
Table 4.1	FC codebook sizes for a different number of phases and TAs.	155
Table 4.2	Codebooks size ( $N_c^{type}$ ) comparison at $N_t = 8, N_t = 4$ .	177
Table 4.3	Number of complex multiplications of various proposed codebooks, DFT codebook, and MMD NCP approach.	184
Table 4.4	Summary of BER and complexity comparisons of various proposed codebooks compared to the non-coded case and FC codebook.	187
Table 4.5	Number of antenna selection and symbol selection bits transmitted from each $k$ th user based on the design of each model.	199
Table 4.6	AS and SS bits distribution for $K = 4$ with equal users' TR's (3 bits/s/Hz).	207
Table 4.7	AS and SS input bits for the models in Figure 4.43.	215
Table 4.8	AS and SS input bits for the models in Figure 4.44.	216

Table 4.9	AS and SS bits distribution for $K = 4$ with equal users' TR's (3 bits/s/Hz).	235
Table 4.10	Summary of comparison between various NOMA-SM models and conventional OMA-SM in terms of SE, EE, and BER.	241

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## LIST OF FIGURES

		PAGE
Figure 2.1	Estimations of global mobile traffic in 2020-2030 (Cisco, 2020).	15
Figure 2.2	NOMA concept for downlink transmission with two users.	21
Figure 2.3	SIMO system with multiple RAs.	24
Figure 2.4	MIMO general structure with multiple transmit and receive antennas.	25
Figure 2.5	Spatial multiplexing MIMO system.	26
Figure 2.6	Power usage of various cellular network elements.	29
Figure 2.7	Distribution of the power consumption in BS.	29
Figure 2.8	General block diagram of SM technique. a) Transmitter, and b) Receiver.	32
Figure 2.9	SM spatial and signal constellations for $N_t = 4, M = 4$ (QPSK).	33
Figure 2.10	General block diagram of SSK technique. a) Transmitter, and b) Receiver.	36
Figure 2.11	MRF transmitter model.	58
Figure 2.12	<i>SRFC1</i> transmitter model.	60
Figure 2.13	<i>SRFC2</i> transmitter model.	61
Figure 3.1	General flow chart of research methodology.	67
Figure 3.2	SSK system model for codebook-based precoding.	70

Figure 3.3	Conventional ICSI-CWS criterion.	80
Figure 3.4	Proposed LCS-CWS criterion.	82
Figure 3.5	Array types when $N_r = 8$ : a) ULA and b) URA	83
Figure 3.6	Proposed FC codebook construction steps.	86
Figure 3.7	An example of the received constellation points at the first receiver antenna for an SSK system with $Nt = 4$ , and $Nr = 2$ . (a) Conventional SSK (i.e., without precoding). (b) Precoded SSK via FC-codebook with $\phi = 4$ phases and ICSI-CWS.	87
Figure 3.8	Proposed Iterative Search (IS) algorithm.	90
Figure 3.9	Proposed construction of the elements of FFC child codebooks.	92
Figure 3.10	Search process to find the best codeword in the FFC method.	94
Figure 3.11	Steps of constructing the proposed IFFC codebook.	97
Figure 3.12	Steps of constructing the proposed AFFC codebook.	99
Figure 3.13	MRF-NOMA-SM for $K$ users, a) Transmitter model, b) Receiver model.	114
Figure 3.14	Transmitter and receiver model of the proposed SRFGen-NOMA-SM system.	120
Figure 4.1	BER comparison between the proposed closed-form, simulated result, and the existed closed-form in the literature for the conventional SSK at $Nt=16$ and various receive antennas $Nr=1, 2$ , and 4.	150

Figure 4.2	BER performance of conventional SSK and precoded SSK through FC codebook and <i>NCP approach</i> (MMD) at $N_t = 4$ , and $N_r = 2$ .	152
Figure 4.3	BER performance of conventional SSK and precoded SSK with FC codebook for different phases at $N_t = 8$ and $N_r = 2$ .	153
Figure 4.4	BER performance vs. several phases for FC codebook-based SSK system at a different number of transmit antennas ( $N_t = 4, 8$ and $16$ ), and $N_r = 2$ .	155
Figure 4.5	BER comparison between the FC codebook and literature precoding techniques at $N_t = 16, N_r = 2$ , and $4$ . DFT codebook (M. C. Lee et al., Sept. 2014, 6-10). <i>NCP approach</i> based on MMD and GED algorithms (M. C. Lee et al., April 2015, 1230-1244).	157
Figure 4.6	BER performance comparison between the Iterative Search (IS) algorithm and FC codebook (based sequential search) at $\phi = 2$ and $\phi = 4$ phases, $N_t = 8$ and $N_r = 2$ .	159
Figure 4.7	BER performance comparison between the low complexity IFFC and FC codebooks at different phases, $N_t = 8$ and $N_r = 2$ .	160
Figure 4.8	BER performance comparison of the IFFC at various lengths and the FC codebook with two phases, $N_t = 8$ , and $N_r = 2$ .	161
Figure 4.9	BER performance comparison between IFFC codebook at different lengths and the FC codebook with $\phi = 4$ phases, $N_t = 8$ and $N_r = 2$ .	162

Figure 4.10	BER performance comparison between AFFC codebook at different lengths and FC codebook with $\phi = 4$ phases, $N_t = 8$ and $N_r = 2$ .	163
Figure 4.11	BER of the orthogonal codebooks (WH, OAT, and QOS) at $N_t = 8$ and $N_r = 2$ . Solid lines: 2-phases. Dashed lines: 4-phases.	164
Figure 4.12	BER performance comparison between orthogonal codebooks and FC codebook for $\phi = 4$ phases, $N_t = 16$ ; $N_r = 2$ and $N_r = 4$ .	165
Figure 4.13	BER vs transmitter antenna correlation coefficient, $N_t = 8$ ; $N_r = 2$ $E_b / N_o = 12 dB$ . Solid lines: 2-phases. Dashed lines: 4-phases.	167
Figure 4.14	BER of various codebooks versus $E_b / N_o$ at $N_t = 8$ ; and $N_r = 2$ in <i>correlated</i> Rayleigh channels ( $\rho = 0.9$ ). Solid lines: 2-phases and dashed lines: 4-phases.	168
Figure 4.15	BER comparison between the LCS-CSI and ICSI-CSI criteria at transmitter correlation coefficient $\rho = 0.9$ , $N_t = 8$ and $N_r = 2$ .	170
Figure 4.16	BER comparison between LCS-CSI and ICSI-CSI criteria with antenna structures (ULA and URA) at the transmitter at $N_t = 8$ , $N_r = 2$ and $\rho = 0.9$ .	171
Figure 4.17	BER at the receiver for $\phi = 2$ phases where $N_t = 8$ and $N_r = 2$ . Solid lines: perfect-CSI. Dashed lines: imperfect-CSI.	172

Figure 4.18	BER at the receiver for $\phi = 4$ phases where $N_t = 8$ and $N_r = 2$ . Solid lines: perfect-CSI. Dashed lines: imperfect-CSI.	173
Figure 4.19	BER performance under un-correlated <i>Nakagami-m</i> fading channels $m = 2$ with $N_t = 8$ and $N_r = 2$ . Solid lines: 2-phases, and Dashed lines 4-phases.	174
Figure 4.20	Codebook sizes versus $N_t$ for FC codebook based (full-search or IS algorithm), and FFC codebook at $N_r = 2$ . Dashed lines: 2-phases. Solid lines: 4-phases.	177
Figure 4.21	IFFC and AFFC codebook sizes compared to the FC codebook size at $\phi = 2$ phases, $N_t = 8$ and $N_r = 2$ .	178
Figure 4.22	IFFC and AFFC codebook sizes compared to the FC codebook size at $\phi = 4$ phases, $N_t = 8$ and $N_r = 2$ .	179
Figure 4.23	Codebook sizes versus TAs for FC, orthogonal, and DFT codebooks for two and 4-phases at $N_t = 8, N_r = 2$ . Dashed lines: 4-phases, and Solid lines: 2-phases.	181
Figure 4.24	Codebook sizes of the Orthogonal codebooks (OAT and WH) compared to the IFFC codebook for $\phi = 2$ phases, $N_t = 8$ and $N_r = 2$ .	181
Figure 4.25	Codebook sizes of Orthogonal codebooks (OAT and QOS) compared to AFFC codebook and the literature DFT codebook for $\phi = 4$ , $N_t = 8$ and $N_r = 2$ .	183
Figure 4.26	Number of complex multiplications for various proposed codebooks, DFT codebook, and MMD <i>NCP approach</i> at $N_t = 8, N_r = 2$ , and $\phi = 4$ .	185

Figure 4.27	Number of complex multiplications comparing the IS algorithm-based FC codebook with 4-phases and MMD at $N_t = 4$ , and $N_r = 8$	186
Figure 4.28	Users' rates and their sum-rate of MRF-NOMA-SM model for both Gaussian and FA inputs (QPSK). $K = 2, N_t = 4$ , and $N_r = 2$ . Fixed-PA ( $\alpha_k = [0.9, 0.1]$ ).	192
Figure 4.29	MI performance of the MRF model in two modeling cases of the IUI effect. $K = 2, N_t = 4$ , and $N_r = 2$ , Gaussian and FA inputs (16-QAM, and QPSK), Fixed-PA ( $\alpha_k = [0.8, 0.2]$ ), $\beta_k(dB) = [0, 6.0206]$ , and correlation-coefficient at the transmitter ( $\rho = 0.6$ ).	193
Figure 4.30	Users' rates and sum-rate of SRFGGen-NOMA-SM model for Gaussian and FA inputs. $K = 2, N_t = 4, N_r = 2$ , QPSK for both users, and $\alpha_k = [0.8, 0.2]$ .	195
Figure 4.31	MI performance comparison between the SRFGGen and the literature case <i>SRFCI</i> under the system configuration of (Y. Chen et al., 2017, 2653-2666).	197
Figure 4.32	Sum-rate of NOMA-SM/SSK models, conventional NOMA, and OMA-SM systems.	200
Figure 4.33	Sum-rate of NOMA-SM/SSK models, conventional NOMA, and OMA-SM systems. $K = 2, N_t = 16, N_r = 4$ , QPSK FA input.	203
Figure 4.34	Sum-rate of NOMA-SM/SSK models, conventional NOMA, and OMA-SM systems. $K = 2, N_t = 16, N_r = 4$ , 16-QAM FA input.	203
Figure 4.35	Individual users' rates of NOMA-SM/SSK models. $K = 2$ , Fixed-PA, and equal TR's (4 bits/s/Hz) per user.	205

Figure 4.36	Sum-rate of NOMA-SM/SSK models. $K = 2$ , Fixed-PA, and equal TR's (4 bits/s/Hz) per user.	206
Figure 4.37	Individual users' rates of NOMA-SM models for $K = 3$ with equal users' TR's (3 bits/s/Hz), $Nr = 4$ , and Fixed-PA. (a) $U1$ rate. (b) $U2$ rate. (c) $U3$ rate.	208
Figure 4.38	Sum-rate of NOMA-SM models with equal users' TR's (3 bits/s/Hz).	209
Figure 4.39	Sum-rate and individual users' rates of SRFGen and <i>SRFC1</i> for two users, $Nt = 16, Nr = 4$ , Fixed-PA, and QPSK input. <i>SRFC1</i> : ( $U1: 4$ , QPSK), ( $U2: 0$ , QPSK). SRFGen: ( $U1: 2$ , QPSK), ( $U2: 2$ , QPSK). $\eta_{SRFGenSum} - TR = \eta_{SRFC1Sum} - TR = 8$ bits/s/Hz.	210
Figure 4.40	Sum-rate and users' rates of C2-1- <i>UnSh</i> and C2-1- <i>Sh</i> for $K = 2, Nt = 16, Nr = 4$ , Fixed-PA, and QPSK input. C2-1- <i>UnSh</i> : ( $U1: 4, 0$ ), ( $U2: 0, QPSK$ ). C2-1- <i>Sh</i> : ( $U1: 2, 0$ ), ( $U2: 2, QPSK$ ). $\eta_{C2-1-UnShSum} - TR = \eta_{C2-1-ShSum} - TR = 6$ bits/s/Hz.	211
Figure 4.41	Sum-rate of SRF-NOMA-SM at different $Nt$ values.	213
Figure 4.42	Sum-rate of NOMA-SSK models at different $Nt$ values.	214
Figure 4.43	Sum-rate comparison of SRFGen and <i>SRFC1</i> for a different $K$ .	215
Figure 4.44	Sum-rate of SSK models for a different number of users.	217
Figure 4.45	Ergodic capacity comparison of various NOMA-SM models, conventional NOMA, and OMA-SM models.	219
Figure 4.46	Ergodic capacity of SRF models and conventional NOMA.	220

Figure 4.47	Ergodic capacity of NOMA-SM models, conventional NOMA, and OMA-SM models. $K = 3, Nt = 16, Nr = 4$ , Fixed-PA, and $\beta k = [1, 2, 4]$ .	220
Figure 4.48	Ergodic capacity comparison between various NOMA-SM, conventional NOMA, and OMA-SM models. $K=3, Nt = 4, Nr = 1$ , Fixed-PA, and $\beta k = [1, 2, 4]$ .	222
Figure 4.49	Ergodic capacity of various NOMA-SM, conventional NOMA, and OMA-SM models. $K=4, Nt = Nr = 4$ , Fixed-PA, and $\beta k(dB) = [0, 6, 12, 18]$ .	222
Figure 4.50	EE of SRFGGen-NOMA-SM, MRF-NOMA-SM, conventional NOMA, and OMA-SM models. $K = 3, Nr = 4$ , Fixed-PA, and $\beta k = [1, 2, 4]$ . Solid lines: $Nt=16$ . Dashed lines: $Nt=4$ . EARTH power model (Elkawafi et al., 2017, 1734-1738) for microcell BS (Stavridis et al., 2013, 1-5).	224
Figure 4.51	EE of SRFGGen-NOMA-SM, MRF-NOMA-SM, conventional NOMA, and OMA-SM models.	225
Figure 4.52	Ratio between users' rates when ESINR-PA and Fixed-PA are applied.	227
Figure 4.53	Ratio between users' rates when ESINR-PA and Fixed-PA are applied.	228
Figure 4.54	Sum-rates of MRF and SRFGGen with ESINR-PA and Fixed-PA.	229
Figure 4.55	BER performance of ESINR-PA compared to Fixed-PA for MRF and SRFGGen. $K = 2$ , and $N_r = 4$ . $N_t = 4$ for MRF model and $Nt = 16$ for SRFGGen.	229
Figure 4.56	Average system BER of NOMA-SM/SSK and OMA-SM, $K=2$ with equal TR (4 bits/s/Hz), $Nr = 4$ , ESINR-PA, and equal channels average power gains $\beta k dB=[0, 0]$ .	230

Figure 4.57	Average system BER of NOMA-SM/SSK and NOMA-SM.	232
Figure 4.58	Users BER comparison among various NOMA-SM/SSK models for $K = 2$ , equal TR (4 bits/s/Hz for each user), $N_r = 4$ , ESINR-PA, and different channel gains $\beta_k dB = [0, 6]$ . Dashed lines: $U_1$ . Solid lines: $U_2$ .	233
Figure 4.59	Users BER comparison among NOMA-SM/SSK models for $K = 3$ , equal TR's (3 bits/s/Hz), $N_r = 4$ , ESINR-PA, and different channel gains $\beta_k (dB) = [0, 6]$ . Dashed lines: Full detector (FD). Solid lines: Next SM user Detector (NSD).	235
Figure 4.60	Average system BER of various NOMA-SM/SSK models and OMA-SM model. $K = 3$ with equal TRs (3 bits/s/Hz), ESINR-PA.	236
Figure 4.61	Average system BER of various NOMA-SM/SSK and OMA-SM models for $K = 4$ with equal TRs (3 bits/s/Hz), $N_r = 4$ , and ESINR-PA.	236
Figure 4.62	Average system BER comparison of SRF-NOMA-SM models at $K = 2, 3$ , and 4 with $N_t = 16$ and QPSK.	238
Figure 4.63	Average system BER comparison of SRF-NOMA-SSK models (C2-1- <i>UnSh</i> and C2-1- <i>Sh</i> ) at $K = 2, 3$ , and 4 with $N_t = 16$ and (QPSK for the SM users).	239
Figure 4.64	Average system BER versus the transmitter correlation coefficient.	240
Figure 4.65	Average system BER versus the transmitter correlation coefficient.	240

## LIST OF ABBREVIATIONS

1G	First Generation
4G	Fourth Generation
5G	Fifth Generation
AFFC	Average Filtration Full-Combination
AS	Antenna Selection
AWGN	Additive White Gaussian Noise
BER	Bit Error Rate
BLAST	Bell Labs layered space-time
BS	Base Station
BPSK	Binary Phase Shift Keying
CC	Cell-center
CDF	Cumulative Distribution Function
CDMA	Code Division Multiple Access
CE	Cell-Edge
CP	Codebook-based Precoding
CSI	Channel State Information
CSIR	CSI at the receiver
CSIT	CSI at the Transmitter
CWS	Codeword Selection
D-BLAST	Diagonal BLAST
ED	Euclidean Distance
EE	Energy Efficiency
eMBB	enhanced Mobile Broadband
ESINR-PA	Equal Signal to Interference plus Noise Ratio

ESM	Enhanced Spatial Modulation
FA	Finite Alphabet
FC	Full-Combination
FFC	Factorized FC
FD	Full Detector
FDD	Frequency Division Duplex
FDMA	Frequency Division Multiple Access
FFC	Factorized Full-Combination
GED	Guaranteed ED
GSM	Generalization of SM
GSSK	Generalized SSK
ICI	Inter-Channel Interference
HCP	Hybrid-CP
IAS	Inter-Antenna Synchronization
ICSI	Instantaneous CSI
IFFC	Index Filtration Full-Combination
i.i.d.	identical and independently distributed
IOT	Internet of Things
IUI	Inter-User Interference
IS	Iterative Search
LA	Link Adaption
LCSI	Long-term Characteristics of CSI
LSM	Layered SM
LTE	Long Term Evolution
LTE-A	Long Term Evolution-Advance
MC	Monte Carlo
MED	Minimum Euclidean Distance
MI	Mutual Information

MIMO	Multiple Input Multiple Output
MISO	Multiple Input Single Output
MLD	Maximum Likelihood Detector
mMTC	massive Machine Type Communication
MU	Multi-User
MRF	Multi-Radio Frequency
MMD	minimum MED
MSSK	M-ary Space Shift Keying
NCP	Non-Codebook-based Precoding
NOMA	Non-Orthogonal Multiple-Access
NP	Non-deterministic Polynomial-time
NSD	Next SM Detector
OAT	Orthogonal Array Testing
OFDMA	Orthogonal Frequency Division Multiple Access
PA	Power Allocation
PDF	Probability Density Function
PRP	Phase Rotation Precoding
PSK	Phase Shift Keying
QAM	Quadrature Amplitude Modulation
QOS	Quasi-Orthogonal Sequences
QPSK	Quadrature PSK
QSM	Quadrature Spatial Modulation
RA	Receive Antenna
RAS	RA Selection
RF	Radio Frequency
RHS	Right Hand Side
Rx	Receiver
SC	Superposition Coding

SC-FDMA	Single Carrier-Frequency Division Multiple Access
SE	Spectral Efficiency
SER	Symbol Error Rate
SFF	Statistically Filtered Full-Combination
SIC	Successive Interference Cancellation
SIMO	Single Input Multiple Output
SINR	Signal to Interference plus Noise Ratio
SISO	Single Input Single Output
SM	Spatial Modulation
SM <sub>x</sub>	Spatial Multiplexing
SNR	Signal to Noise Ratio
SRF	Single-Radio Frequency
SRFC1	<i>SRF-Case1</i>
SRFC2	<i>SRF-Case2</i>
SRFGen	Generalized SRF
SS	Symbol Selection
SSK	Space Shift Keying
STC	Space-Time-Coding
SU	Single-User
TA	Transmit Antenna
TAS	TA Selection
TAG	Transmit Antenna Grouping
TDMA	Time Division Multiple Access
TP	Transmit Precoding
TR	Transmission Rate
Tx	Transmitter
TTD	Time Division Duplex
UE	User Equipment

ULA	Uniform Linear array
URA	Uniform Rectangular Array
URLLC	Ultra-reliable low latency communication
VBLAST	Vertical Bell Labs Layered
V2V	Vehicle to Vehicle
WH	Walsh-Hadamard

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