

# Table of Contents

<b>Abstract</b>	<b>vii</b>
<b>Deutsche Kurzfassung</b>	<b>ix</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Motivation . . . . .	1
1.2 Contributions and outline of the thesis . . . . .	3
<b>2 Background on MPC and parametric optimization</b>	<b>7</b>
2.1 Model Predictive Control . . . . .	7
2.2 Parametric optimization . . . . .	11
<b>3 General results on semi-explicit MPC based on subspace clustering</b>	<b>17</b>
3.1 Introduction and problem formulation . . . . .	17
3.2 The parametrizations and their application to multi-parametric programs .	18
3.3 Finding the parametrizations . . . . .	22
3.4 The semi-explicit MPC algorithm . . . . .	27
3.5 Examples and evaluation . . . . .	35
3.6 Summary . . . . .	44
<b>4 Semi-explicit MPC for linear systems</b>	<b>47</b>
4.1 Introduction and problem formulation . . . . .	47
4.2 The parametrizations applied to linear MPC problems . . . . .	48
4.3 Computing feasible parametrizations: The offline algorithm . . . . .	50
4.4 Semi-explicit MPC for linear systems: The online algorithm . . . . .	66
4.5 Examples and evaluation . . . . .	76
4.6 Summary and extensions . . . . .	92
<b>5 Almost explicit MPC for linear systems</b>	<b>95</b>
5.1 Introduction and problem formulation . . . . .	95
5.2 Basic almost explicit strategy . . . . .	96
5.3 Simplified almost explicit strategy . . . . .	98
5.4 Examples and evaluation . . . . .	102
5.5 Summary and extensions . . . . .	108
<b>6 Semi-explicit MPC for nonlinear systems</b>	<b>111</b>
6.1 Introduction, problem formulation and preliminaries . . . . .	111
6.2 Guaranteeing feasibility for nonlinear systems . . . . .	114
6.3 Computing feasible parametrizations: The offline algorithm . . . . .	120
6.4 Example and evaluation . . . . .	124
6.5 Summary and extensions . . . . .	128

<b>7 Conclusion</b>	<b>129</b>
7.1 Summary . . . . .	129
7.2 Outlook . . . . .	130
<b>Bibliography</b>	<b>133</b>