

<b>List of Figures</b>	<b>vii</b>
<b>List of Tables</b>	<b>ix</b>
<b>1 Introduction</b>	<b>1</b>
1.1 The Significance of Machine Translation . . . . .	1
1.2 Structure of the Thesis . . . . .	2
<b>2 Basic Notions and Notation</b>	<b>3</b>
2.1 Typical Scheme of Machine Translation . . . . .	3
2.2 Linguistic Levels . . . . .	4
2.2.1 Analytical Level (surface syntax) . . . . .	5
2.2.2 Tectogrammatical Level (deep syntax) . . . . .	5
2.3 Equivalence of Linguistic Expressions . . . . .	6
2.4 Topic-Focus Articulation . . . . .	7
2.5 Markedness and Underspecification . . . . .	7
2.5.1 Markedness . . . . .	7
2.5.2 Underspecification . . . . .	8
2.6 Notations of Data Structures and Rules . . . . .	9
2.6.1 Feature Structures . . . . .	10
2.6.2 Charts . . . . .	10
2.6.3 Grammar Rules . . . . .	11
<b>3 Basic Facts about Baltic and Slavic Languages</b>	<b>13</b>
3.1 Baltic languages . . . . .	13
3.1.1 Extinct Baltic languages . . . . .	13
3.1.2 Living Baltic languages . . . . .	14
3.2 Slavic languages . . . . .	15

3.2.1	Extinct Slavic languages . . . . .	15
3.2.2	Living Slavic languages . . . . .	15
<b>4</b>	<b>An Overview of MT Systems between Related Languages</b>	<b>21</b>
4.1	Slavic Languages . . . . .	21
4.1.1	RUSLAN . . . . .	21
4.1.2	Česílko . . . . .	21
4.1.3	GUAT . . . . .	23
4.2	Scandinavian Languages . . . . .	23
4.2.1	PONS . . . . .	23
4.2.2	Norwegian-Danish . . . . .	24
4.2.3	T4F . . . . .	25
4.3	Turkic Languages . . . . .	26
4.4	Celtic Languages . . . . .	26
4.5	Romance Languages . . . . .	27
<b>5</b>	<b>Free-rides in Baltic and Slavic Languages</b>	<b>31</b>
5.1	Typological Similarity . . . . .	31
5.2	Syntactic Similarity . . . . .	32
5.2.1	Syntactic Underspecification . . . . .	32
5.3	Morphological Similarity . . . . .	35
5.4	Lexical Similarity . . . . .	36
<b>6</b>	<b>Syntactic Relationships in Baltic and Slavic Languages</b>	<b>37</b>
6.1	The Morphosyntax of Baltic and Slavic Noun Phrases . . . . .	37
6.1.1	Morphosyntactic Categories of Noun Phrases . . . . .	39
6.1.2	The Category of Definiteness . . . . .	40
6.1.3	Adjectival Agreeing Attributes . . . . .	41
6.1.4	Non-agreeing Genitive Attributes . . . . .	42
6.1.5	Prepositional Phrases as Attributes . . . . .	43
6.1.6	Appositions . . . . .	44
6.2	The Morphosyntax of Baltic and Slavic Verb Phrases . . . . .	44
6.2.1	Morphosyntactic Properties of Verb Phrases . . . . .	45
6.2.2	Non-canonical Cases of Morpho-syntactic Linking . . . . .	52

<b>7</b>	<b>Partial Parser for Baltic and Slavic Languages</b>	<b>59</b>
7.1	Tasks of the Parser . . . . .	59
7.1.1	The Computational Formalism . . . . .	60
7.2	Main Principles of Parsing Rules . . . . .	60
7.2.1	Chain Link (shackle) . . . . .	61
7.2.2	Elimination of Identical Results . . . . .	63
7.3	Multigraph Clean-up and Further Optimization . . . . .	64
7.4	Using the Parser in a Production Environment . . . . .	66
<b>8</b>	<b>Transfer and Syntactic Synthesis</b>	<b>69</b>
8.1	Lexical Transfer . . . . .	69
8.2	Structural Transfer . . . . .	69
8.2.1	Transfer Directives . . . . .	69
8.2.2	Translation of Multiword Expressions . . . . .	72
8.3	Chaining MT Systems . . . . .	73
8.3.1	Discussion . . . . .	74
<b>9</b>	<b>Statistical Ranking and Evaluation</b>	<b>77</b>
9.1	Ranking . . . . .	77
9.2	Evaluation . . . . .	78
9.2.1	Discussion . . . . .	79
<b>10</b>	<b>Concluding Discussion</b>	<b>83</b>
10.1	Shallow NLP and the Role of Statistics in MT . . . . .	83
10.1.1	Dealing with Extensive Morphological Ambiguity . . . . .	83
10.1.2	On the Lexical and Structural Non-Determinism in MT . . . . .	84
10.1.3	The Interplay between Rule-Based and Statistical Modules . . . . .	84
10.2	Contribution of the Thesis . . . . .	85
<b>A</b>	<b>Czech Parser Rules</b>	<b>87</b>
A.1	Shallow Rules . . . . .	88
A.2	Deep rules . . . . .	89
	<b>Summary</b>	<b>93</b>
	<b>Bibliography</b>	<b>95</b>
	<b>Index</b>	<b>99</b>