Contents

Acknowledgements **9**

Summary **11**

Streszczenie **13**

Zusammenfassung **15**

1. Introduction **17**

2. Coherent synthesis of computer systems – model and method **18**

2.1. Classical process of computer synthesis 18
2.2. General model for the problem of system synthesis 19
2.3. Process of parallel synthesis of computer systems 22

3. Evolutionary method for coherent synthesis of computer systems **24**

3.1. Data structures 25
3.2. Resource partition 30
3.3. Task scheduling 40
3.4. Coherent resource partition and task scheduling 45
3.5. Computational experiments 48
3.6. Conclusions 62
3.7. Example of coherent synthesis application 62

4. Tabu search method for coherent synthesis of computer systems **70**

4.1. General idea and an example of the use of tabu search method 70
4.2. Resource partition 74
4.3. Task scheduling 74
4.4. Coherent resource partition and task scheduling 76
4.5. Computational experiments 78
4.6. Conclusions 83

5. Neural method for coherent synthesis of computer systems **84**

5.1. Neural network model 84
5.2. Algorithm description 86
5.3. Task scheduling 87

5.4. Resource partition 100
5.5. Coherent resource partition and task scheduling.....104
5.6. Computational experiments 109
5.7. Conclusions.....118

6. Ant colony and Branch & Band methods for coherent synthesis of computer systems.....119

6.1. Adaptation of ACO to solve the problems of synthesis 119
6.2. Adaptation of B & B to solve the problems of synthesis 123
6.3. Computational experiments 124
6.4. Conclusions.....149

7. The comparison of coherent synthesis algorithms 149

7.1. Resource partition 149
7.2. Task scheduling 164
7.3. Coherent resource partition and task scheduling.....176

8. Résumé, conclusions, further research.....194

Bibliography 198