

Recommendation for the defense of Ph.D. thesis

Ph.D. candidate: Ing. Jitka Kocnová

Supervisor: Doc. Ing. Zdeněk Vašíček, Ph.D.

Thesis title: Evolutionary Synthesis of Complex Digital Circuits

Jitka Kocnová joined the Ph.D. programme at the Faculty of Information Technology of the Brno University of Technology in September 2017. Her research topic falls within the field of logic synthesis, focusing on the development of a method for optimising combinational circuits. Her Ph.D. research is a continuation of her Master's thesis, which experimentally verified the feasibility of the concept on small circuits. The key idea was to use evolutionary algorithms to optimise the circuits. To develop a method that can compete with traditional synthesis techniques in terms of circuit area and/or delay, it was necessary to enrich the evolutionary approach with a suitable technique for maintaining scalability, which turned out to be a challenging problem.

Jitka systematically addressed her dissertation topic, demonstrating a creative approach and the ability to obtain original scientific results. During her dissertation she was employed by a company involved in the design and manufacture of ASICs for the automotive industry. This involvement had the advantage of allowing her to use her practical knowledge in her dissertation, albeit at the cost of not being able to fully devote her time to her dissertation. Despite the higher level of industry involvement, new results have been continuously produced. In total, three different approaches were proposed, evaluated and published.

Jitka contributed to a total of five high-quality conference papers and one journal publication. I would highlight that the conference paper published at EuroGP 2019, the distinguished and prominent evolutionary conference in Europe, was nominated for the best paper award. The Scopus database shows eight citations after removing the self-citations of all co-authors. Jitka has also been involved in teaching and several research projects, demonstrating her involvement in various scientific initiatives. As Jitka has co-authored several high-quality publications covering the subject matter, the dissertation has been written as a commented collection of articles with an introduction to the field.

To conclude, I recommend Jitka Kocnova's Ph.D. thesis for defense. I would like to acknowledge Jitka's patience and dedication, especially in finishing and writing her dissertation, even though she encountered many challenges along the way. I wish her all the best in her professional and personal life.

In Brno, December 12th 2023

Zdeněk Vašíček