

Supervisor's report of a doctoral dissertation

Title of the Ph.D. thesis: *Fault-tolerant systems design automation*

Ph.D. candidate: *Ing. Jakub Lojda*

Supervisor: *prof. Ing. Lukáš Sekanina, Ph.D.*

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Jakub Lojda joined the PhD program in September 2015. His research topic was supervised by doc. Zdeněk Kotásek, after whose death in January 2022 it was necessary to find a new supervisor. As I was partly involved in the design for FPGAs as well as fault-tolerant systems, I was able to take over the role of Jakub's supervisor. By this time, Jakub had largely completed his research. We focused on creating a journal article summarizing the proposed methods and writing a dissertation. The article was accepted and published in the Microelectronics Reliability journal in 2023.

The topic of Jakub's dissertation falls into the area of automated design methods applied to the automated design of fault-tolerant digital circuits implemented in FPGAs. The proposed methods automatically select and insert fault-tolerant mechanisms at the source code level and generate the implementation in FPGAs. The proposed solution is also able to utilize the principles of partial dynamic reconfiguration. The functionality of the proposed method is verified in various case studies. An integral part of the work is the automated fault tolerance evaluation and the development of methods to evaluate the reliability of a given implementation efficiently.

Jakub systematically dealt with his dissertation topic, demonstrating a creative approach and the ability to obtain original scientific results. He has contributed to two journal publications. The DBLP database contains 28 conference papers co-authored by Jakub, which is above average. The Scopus database shows 20 citations after removing the self-citations of all co-authors. Jakub has been involved in eight research projects. He has also actively participated in the PAD PhD seminars and given talks at the department's meetings. As Jakub 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.

I strongly **recommend** the submitted doctoral dissertation of Jakub Lojda for defense.

prof. Ing. Lukáš Sekanina, Ph.D.
supervisor of the thesis