

Opponent Review of Doctoral Dissertation

Applicant: Ing. David Krolák

Title of Dissertation: An EMC Robust Precise Voltage Reference for Automotive Applications

Opponent: Pro. Costas Psychalinos

Opponent's Department: University of Patras, Physics Department, Electronics Laboratory, GR26504,
Rio Patras, Greece.

In accordance with the Study and Examination Rules of BUT, in his/her review the opponent will mainly comment on:

- a) the topicality of the dissertation,*
- b) whether the dissertation achieved its given objective,*
- c) the problem-solving procedure and the results of the dissertation along with the concrete contribution of the doctoral student,*
- d) the significance for practical application or the progress in the field,*
- e) formal and language qualities of the dissertation,*
- f) whether the dissertation fulfils the conditions of Section 47 (4) of the Act,*
- g) whether the student proved his/her creative abilities in the given research field and whether the work does or does not comply with the standard requirements placed on the dissertations in the given field. The review is not valid without this conclusion.*

It is necessary to add a concise commentary to each of the points below.

Ad a) Topicality of the dissertation

The topic of the dissertation is very topical.

Comment: The topic of this dissertation is on the exploitation and development of methods and systems for reducing electromagnetic interference (EMI) susceptibility of low-power voltage references, for an automotive environment with a wide temperature range. Generally, this is a very topical area related to a wide range of applications, including the automotive applications which are the subject of this dissertation.

Ad b) Objective of the dissertation

The objective of the dissertation was achieved.

Comment: The main objective of this dissertation is to provide advanced methods to reduce electromagnetic interference (EMI) susceptibility of low-power voltage references for an automotive environment with a wide temperature range. This is achieved through the development of structures which offer improved EMI robustness, with regards to the literature.

Ad c) Problem-solving procedure and the results of the dissertation and the concrete contribution of the doctoral student

The problem-solving procedure and the results of the dissertation are above average.

Comment: The candidate followed the typical procedure for developing novel circuits/systems. The first step was the exploitation of the literature, while the second one was the development of new topologies. Another important point is that the proposed topologies have been fabricated and experimentally verified by the doctoral student.

Ad d) Significance for practical application or progress in the field

The significance for practical application or progress in the field is above average.

Comment: The significance for practical application is above the average, because this dissertation contributes to the improvement of the performance of voltage reference circuits in the challenging environment of automotive applications. This is proved through the comparison of the performance of the newly developed topologies with those already published in the literature.

Ad e) Formal and language qualities of the dissertation

Formal and language qualities of the dissertation are average.

Comment: These could be further improved after a careful typesetting and, revising the format within the Chapters (e.g. paragraphs etc).

Ad f) The dissertation fulfils the conditions of Section 47 (4) of the Act

The dissertation fulfils the conditions of Section 47 (4)*) Act No. 111/1998 Sb. Higher Education Act: YES

*(*4) Studies are duly finished with a doctoral state exam and dissertation defence, which prove the ability and readiness to work independently in the field of research or development, or in theoretical and creative arts. The dissertation must comprise original and published results or results accepted for publication.*

Ad g) Creative abilities of the student in the given research field. Compliance with the standard requirements placed on the dissertations in the given field.

The doctoral student did prove his creative abilities in the given research field and the work does comply with the standard requirements placed on the dissertations in the given field.

Comment: This is derived from the development of the improved voltage reference structures, the development of the associated software and, also, from the establishment of a suitable experimental environment for verifying the behaviour of the developed structures.

Overall evaluation: This dissertation is recommended for awarding the Ph.D. degree.

Opponent's questions:

I have the following suggestions/questions:

1. The abstract could be revised to clearly describe the contribution made in this work.
2. The contribution made in this dissertation should be evident in the titles of the corresponding sections. Therefore, my advice is to clearly give titles of the associated sections as: "Proposed"
3. It would be great if you could briefly describe the limitations of the developed structures, as well as plans/suggestions for further development, in the Conclusions Section.

I recommend do not recommend the dissertation for the defence.

Date: 09.02.2024

Signature: