Skoltech
Skolkovo Institute of Science and Technology

Thesis Changes Log

Name of Candidate: Ioannis Georgakis

PhD Program: Computational and Data Science and Engineering

Title of Thesis: Fast integral equation methods and performance bounds of modern magnetic resonance coils

Supervisor: Prof. Maxim Fedorov

Co-advisor: Dr. Athanasios Polimeridis

Chair of PhD defense Jury: Prof. Ivan Oseledets ***Email**: I.Oseledets@skoltech.ru*

Date of Thesis Defense: 28 November 2019

The thesis document includes the following changes in response to the external review process.

Dear jury members, thank you for your comments and questions during the defense. Please find below the replies.

1. *Deconvolve contributions to the open-source code, if possible.*
The contributions of the thesis to the open source code include the implementation of the VIE solver with PWL basis functions as well as the reduction of the volume-volume integrals to surface-surface where the latter are computed with the existing sophisticated cubatures of DIRECTFN. That clarification has been added at the *Conclusions* chapter.

2. *Comment on H-matrices with many right-hand sides, and other modern numerical techniques (tensor decompositions).*
Comments on *H*-matrices with many right-hand sides and other modern numerical techniques such as tensor decompositions have been added below Section *Memory Footprint Reduction* at a new Section entitled *Modern Numerical Techniques and Single Source Representation Formulation*.

3. *Give a better flavour of the actual computational times compared to FDTD (more numbers and references on comparison).*
Computational times for the VIE solver and their comparison with FDTD have been added above *Conclusions* Section at a new Section entitled *Computational Times of VIE and FDTD*. Additionally, computational times for the VIE solver with PWL basis functions and the accelerated matrix-vector product with the Tucker decomposition exist in published work [163] and are further mentioned at the thesis.

4. *More comments on single source representation (in Chapter 4 a new section can be added).*
Comments on the single source representation have been added below Section *Memory Footprint Reduction* at a new Section entitled *Modern Numerical Techniques and Single Source Representation Formulation*.

5. *Connection of the introduced optimality measure to clinical modality of the scanner (T1/T2/relaxation of time scales).*
A new paragraph has been added at the *Conclusion* chapter commenting on the connection of the introduced optimality measures to clinical MR scanners.