

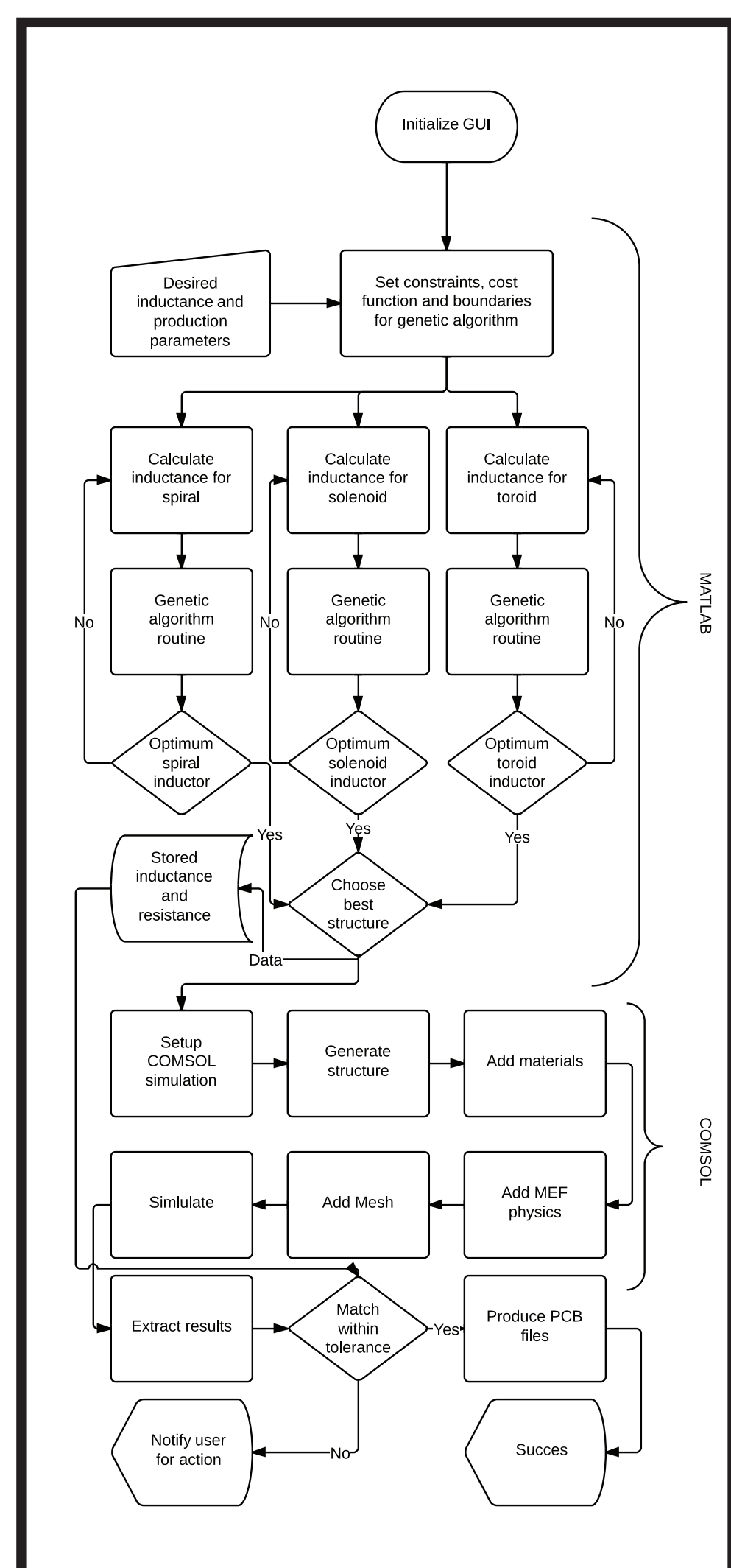
Design Optimization of Printed Circuit Board Embedded Inductors through Genetic Algorithms with Verification by COMSOL

Mickey P. Madsen*, Jakob D. Mønster, Arnold Knott and Michael A.E. Andersen

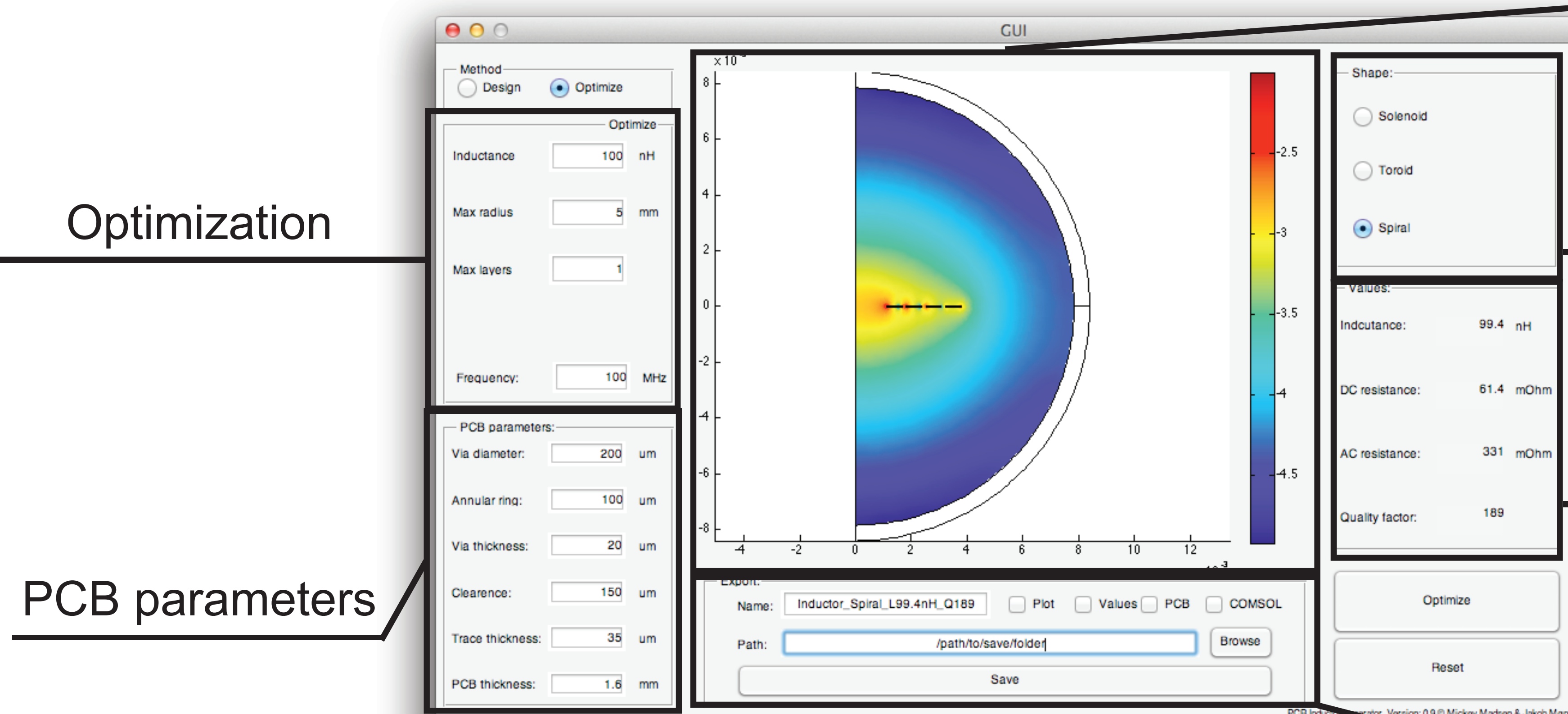
Technical University of Denmark, Department of Electrical Engineering, Electronics

*Corresponding author: Oerstedts Plads 349, Kgs. Lyngby, 2800, Denmark, mpma@elektro.dtu.dk

Matlab LiveLink and optimization



Optimization algorithm



Matlab GUI for optimizing and designing PCB embedded inductors

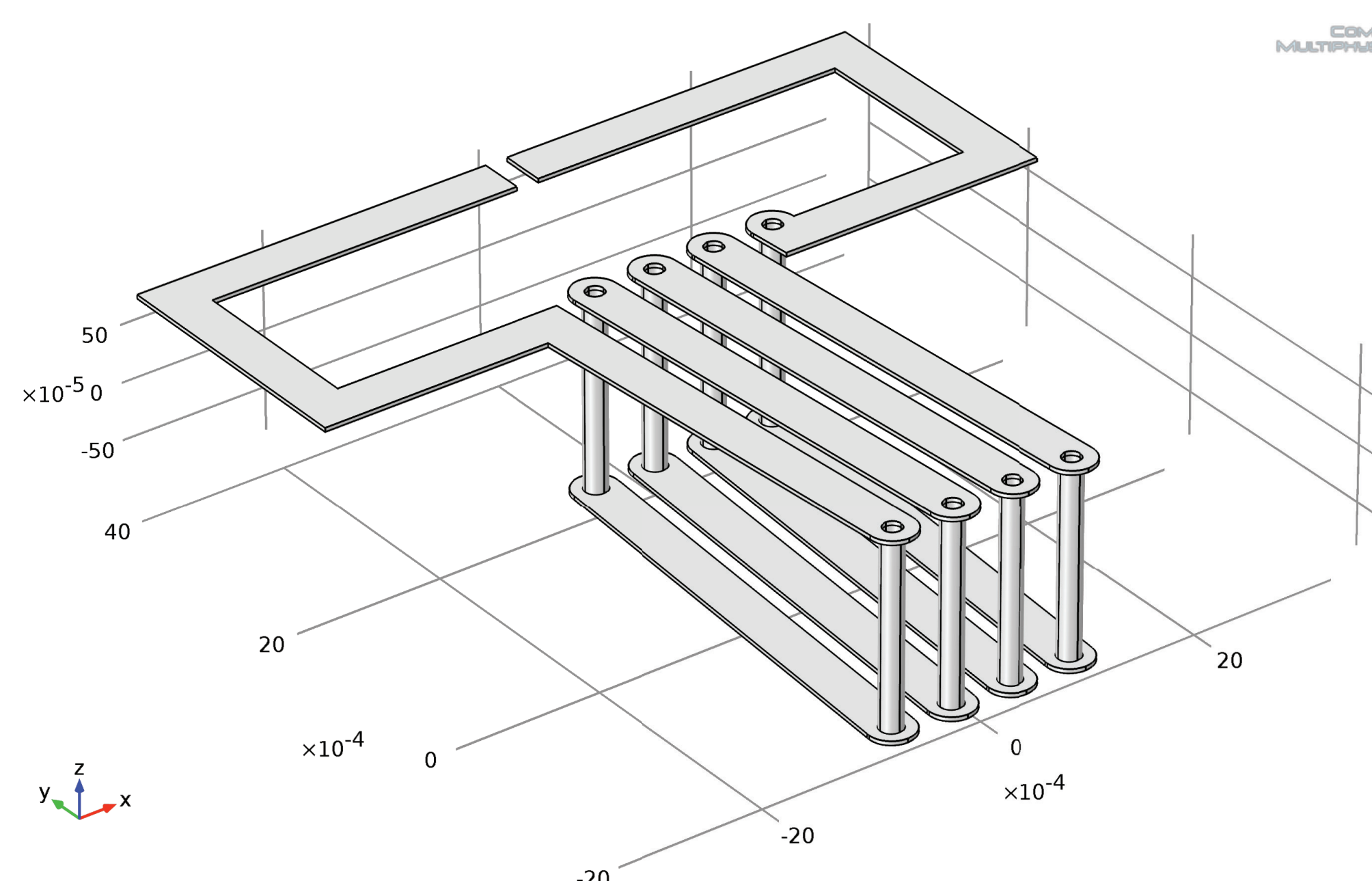
Visual feedback from the simulation, returned by "mphplot"

Shape selector: Solenoid, toroid or spiral inductor

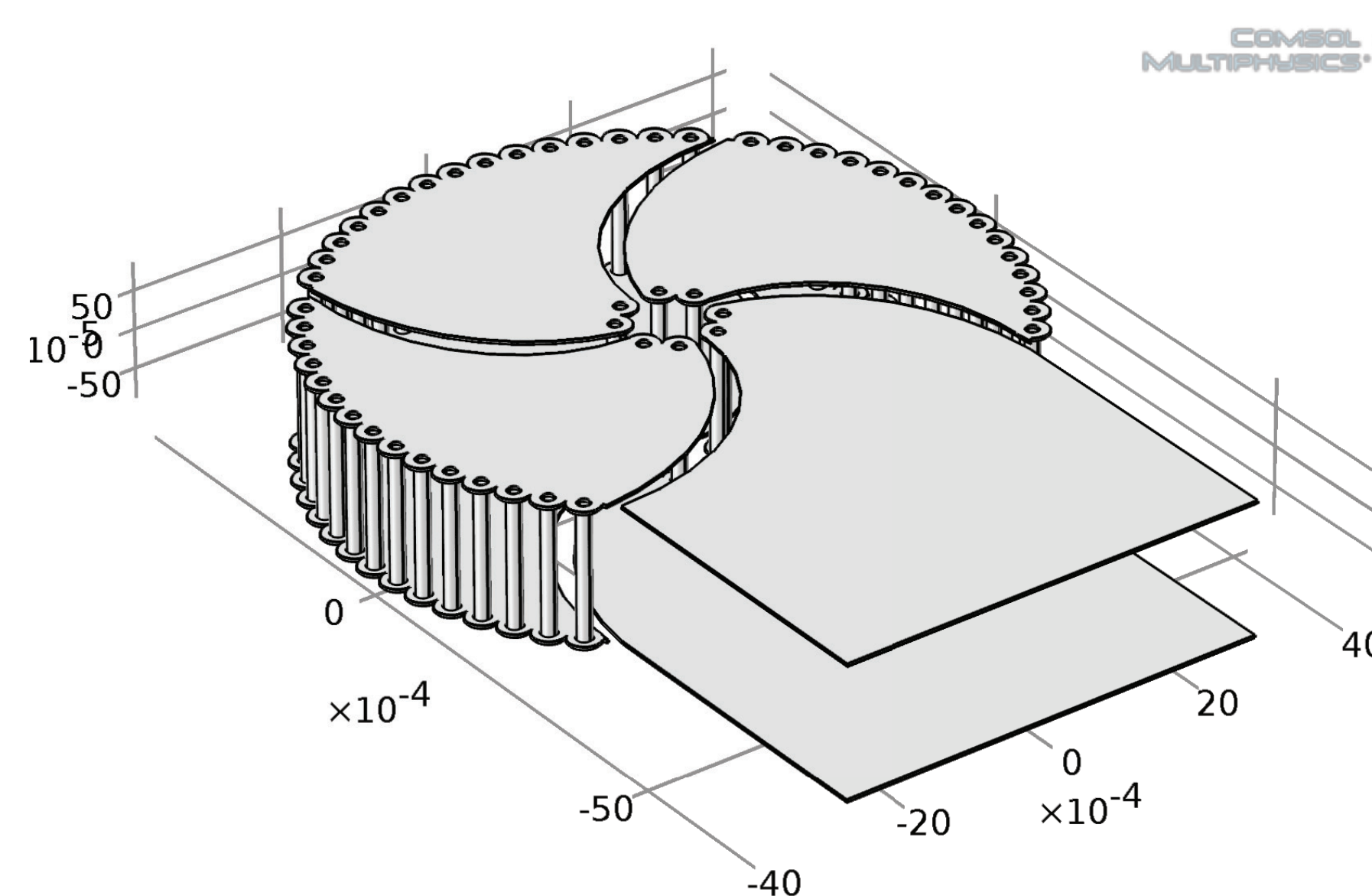
Simulated global evaluation variables, returned by "mphtable"

Possibility for saving the simulated values, PCB production files, the plot and the COMSOL model

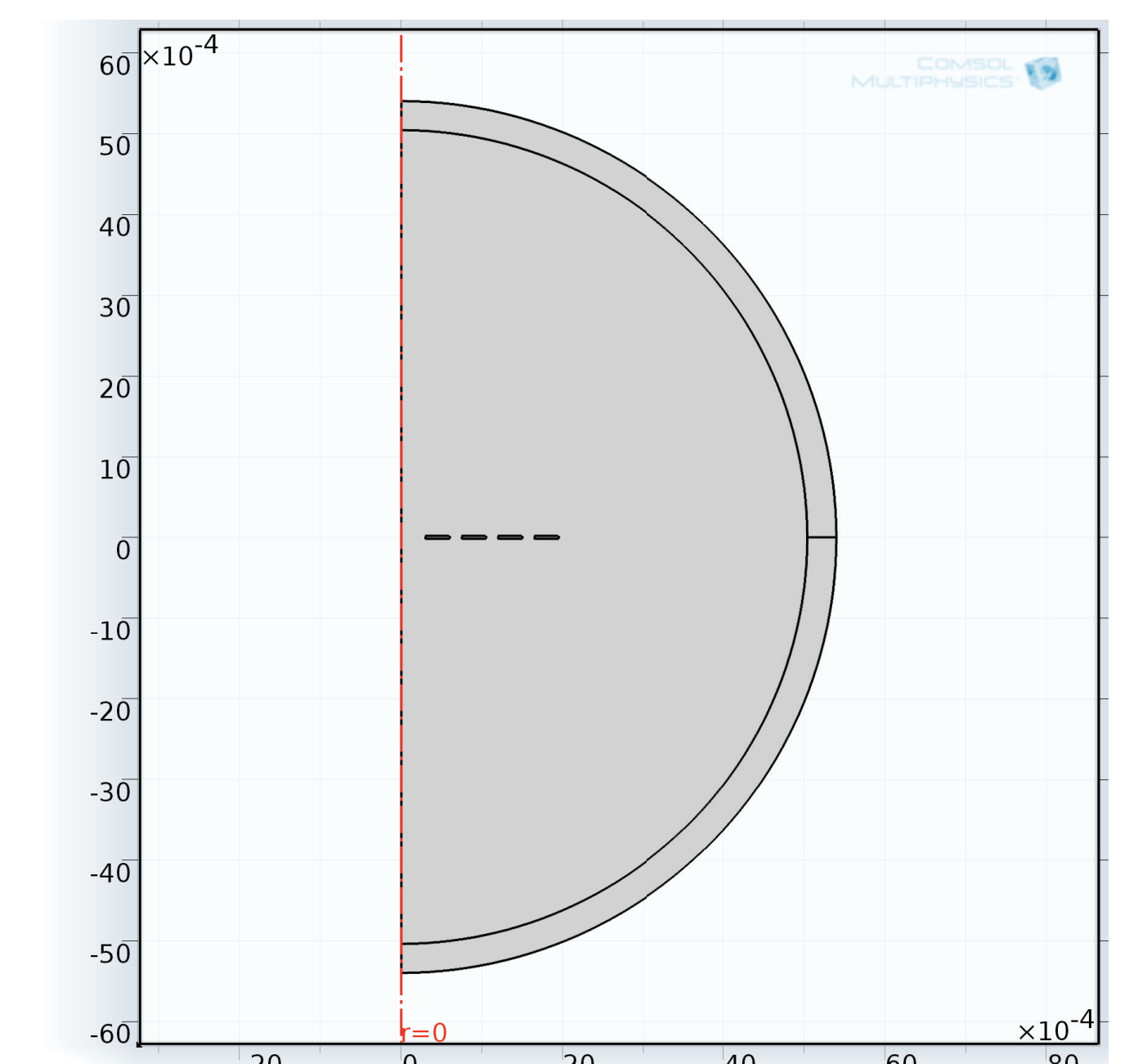
COMSOL Setup



3D model of a solenoid inductor

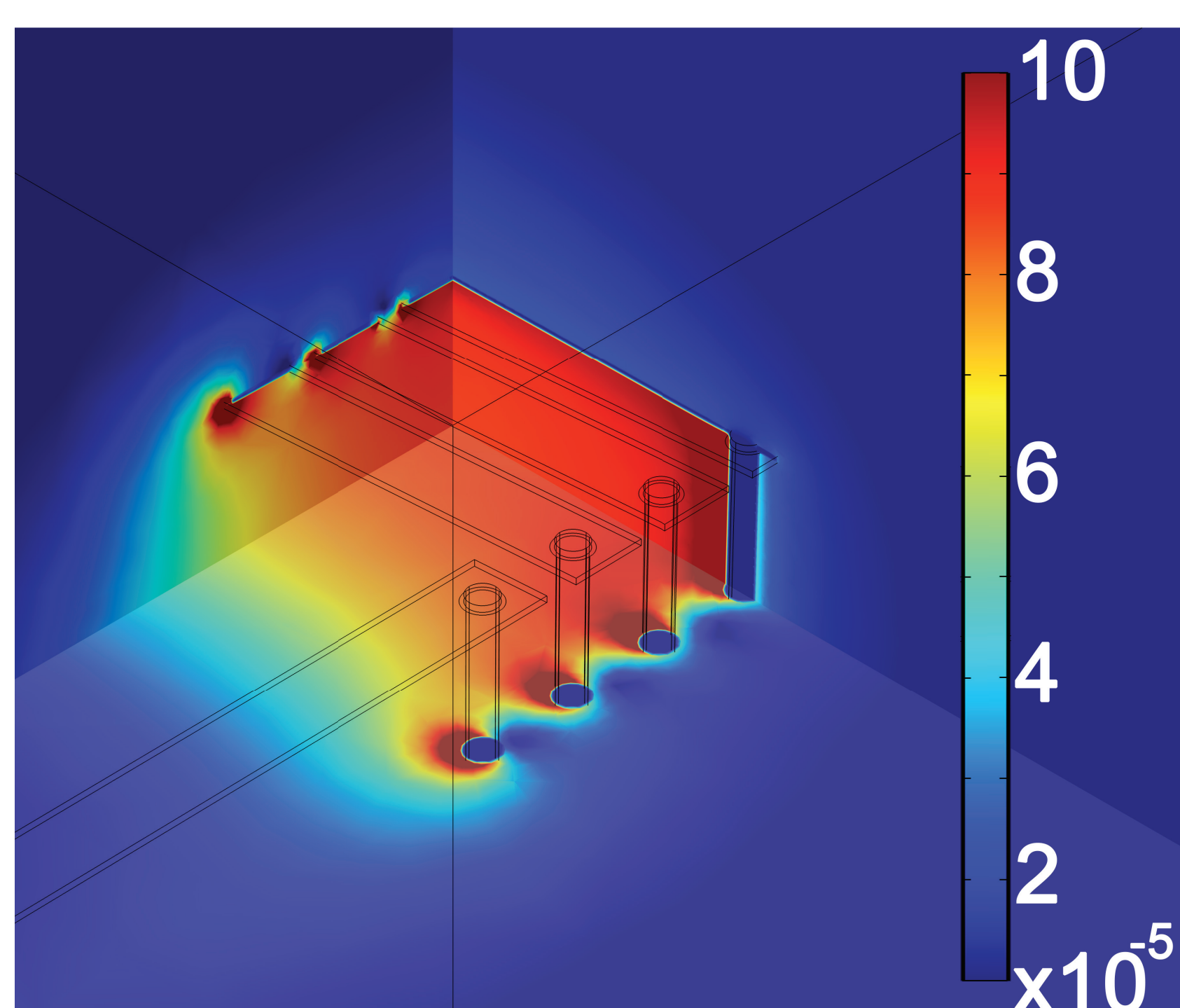


3D model of a toroid inductor

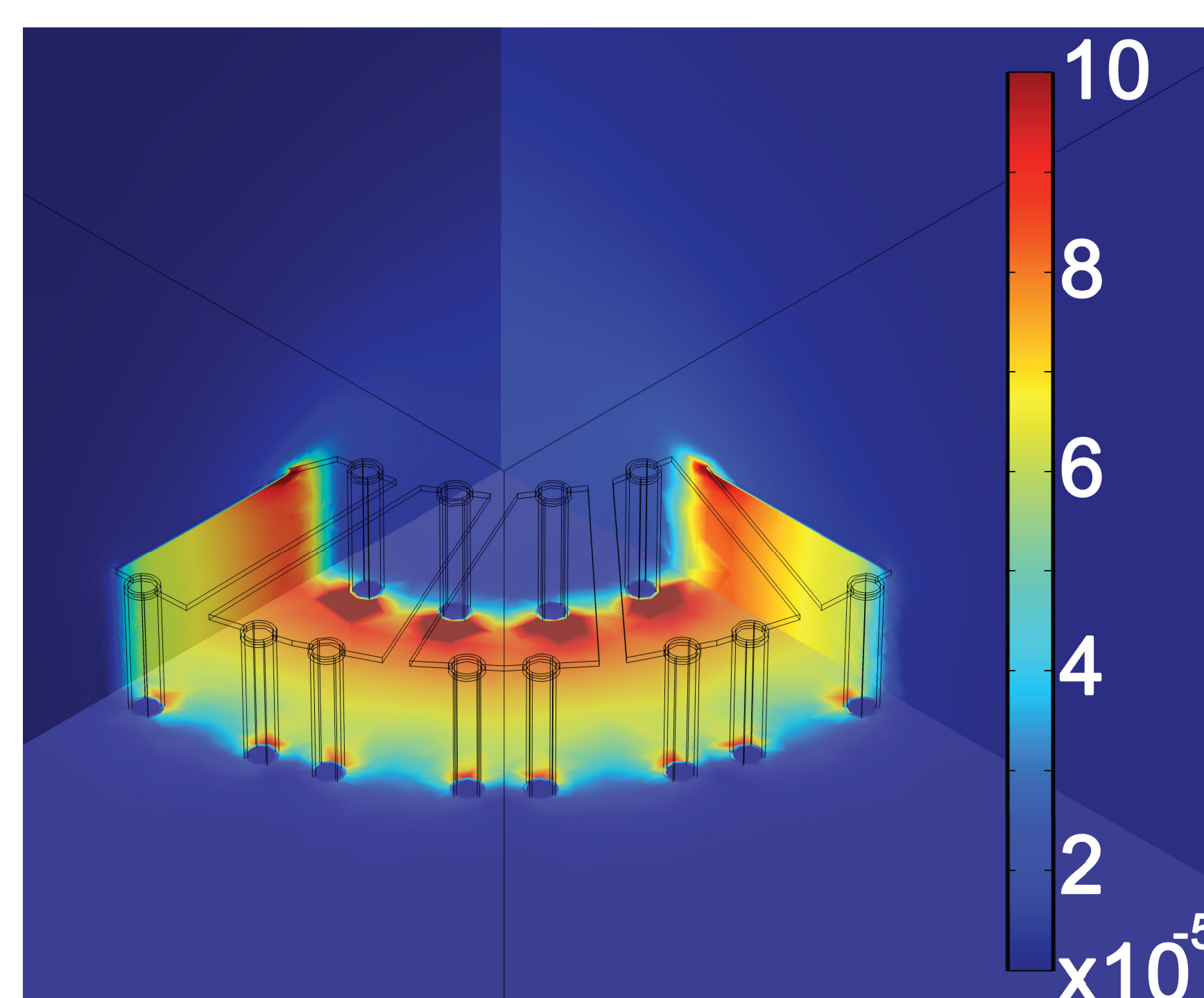


2D model of a PCB spiral inductor

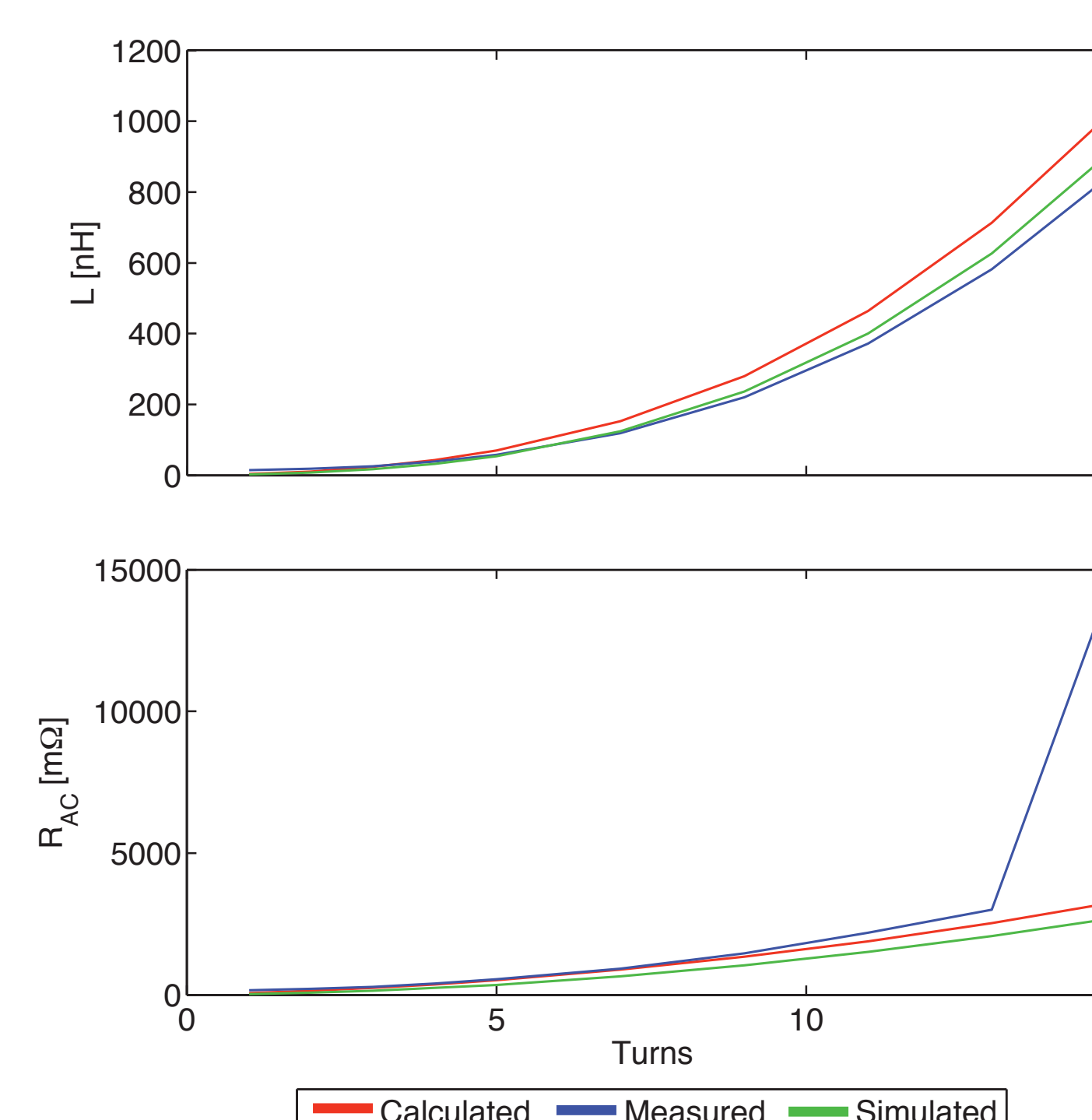
Results & verification



Magnetic flux density of a simulated solenoid inductor



Magnetic flux density of a simulated toroid inductor



Comparison of calculated, simulated and measured inductances and ac-resistance of two sets of spiral inductors