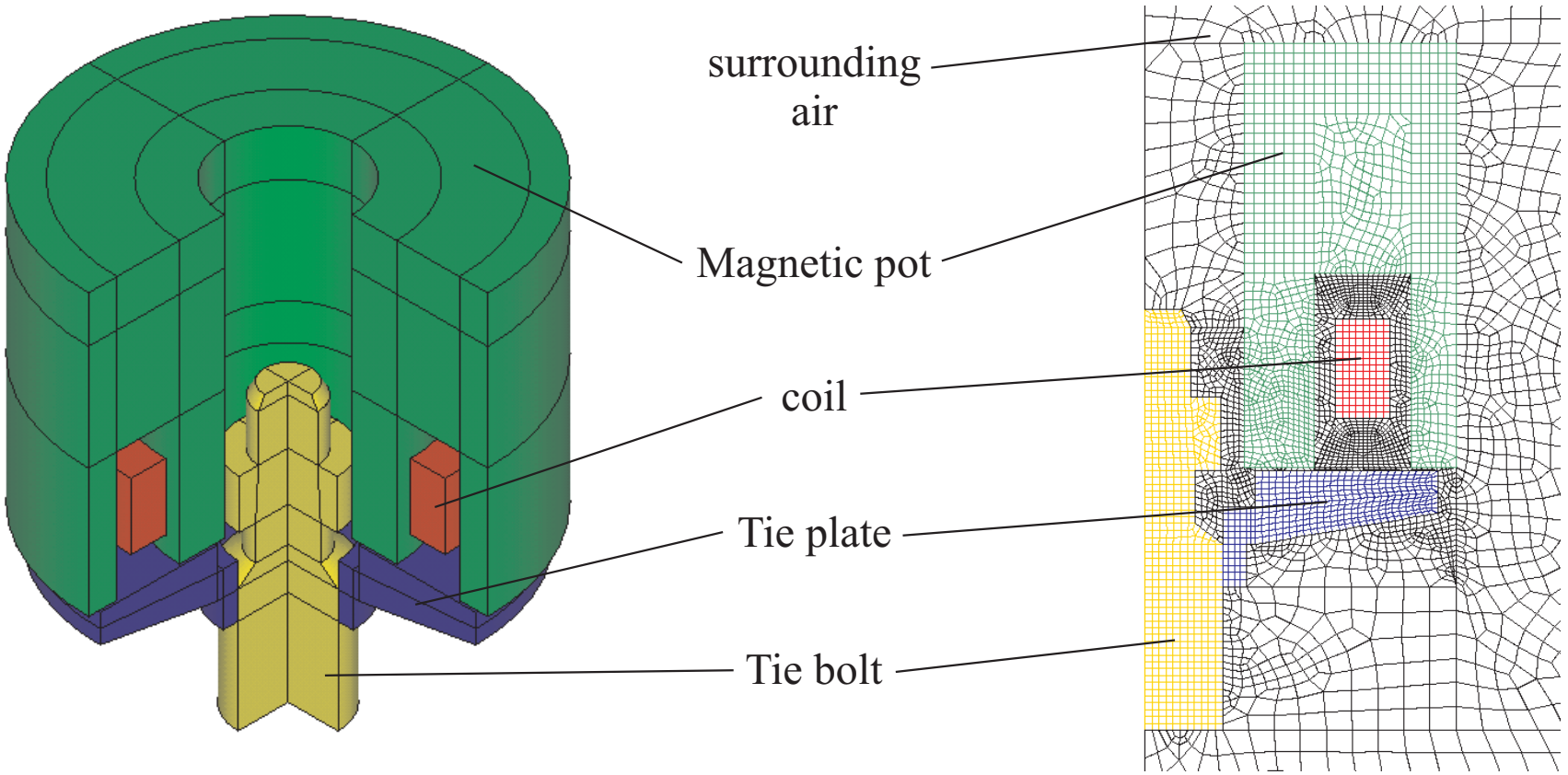
Simulation of a Solenoid Valve

Schematic

Detail of the FEM-Model



Problems in this simulation

I. 3D-problem ⇒ Large number of unknowns

II. Movement of the rotor ⇒ Mesh distortion (geometric nonlinearity)

III. Nonlinear mechanical spring

IV. Magnetic material nonlinearity

⇒ **Solution with our software**

ad I. Efficient algorithms and iterative solvers

ad II. Moving mesh algorithm

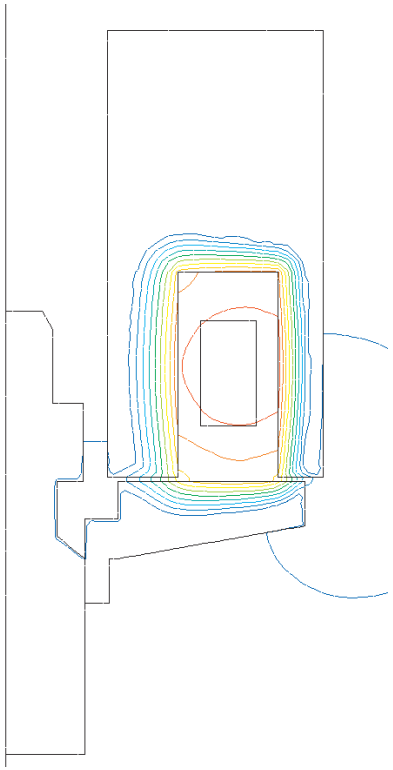
ad III. Nonlinear spring-elements

ad IV. Iterated solution based on energy functional and relaxations

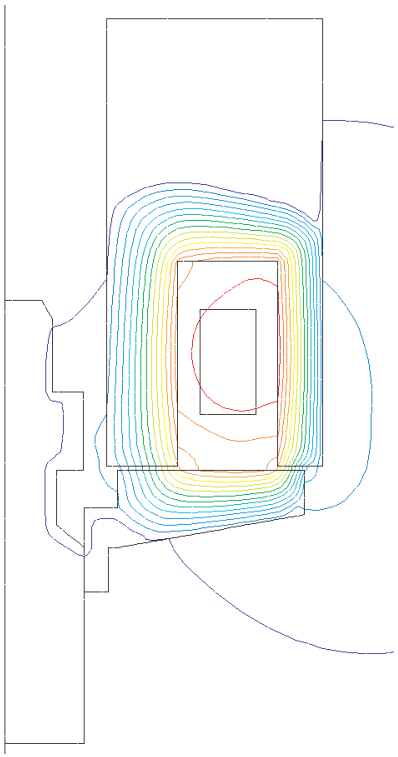
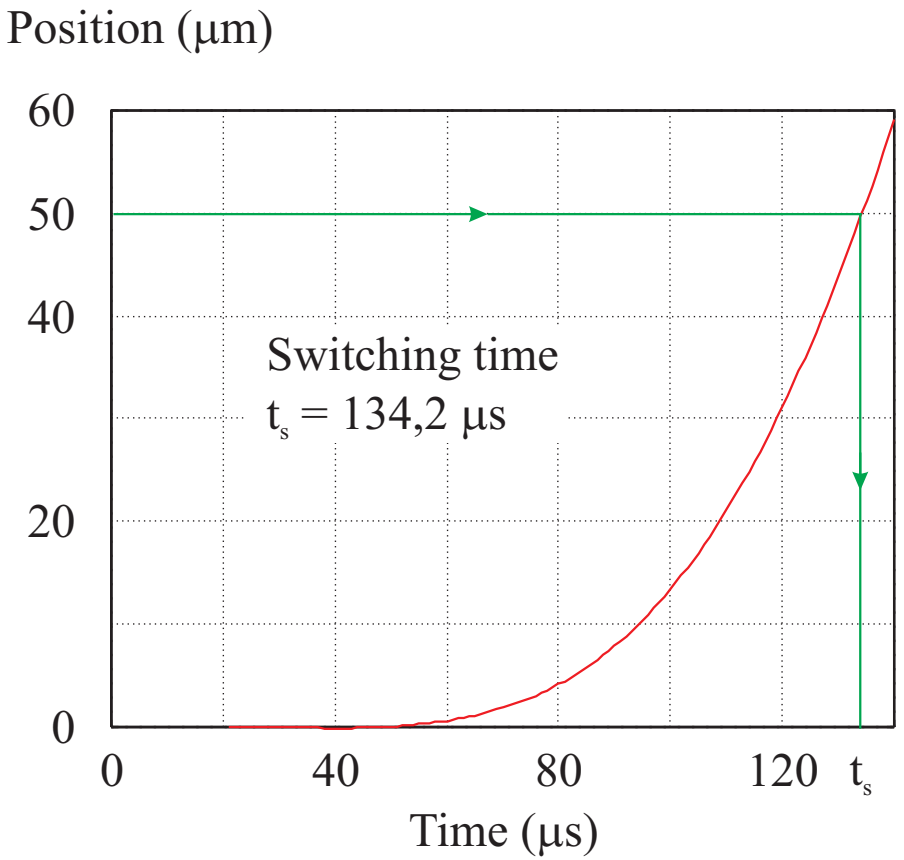
Results

Calculated Magnetic Field

after 50 µs



after 100 µs



Calculated position of the tie plate