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Numerical modeling of electromagnetic vibrations in a conductive workpiece

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In this research COMSOL multiphysics 5.3 numerical modelling software is used. A mathematical model based on a real induction coil is created. When an induction coil like in the Institute of Physics of the University of Latvia is created, various physics modules are sequentially added: magnetic field, electromagnetic induction, thermal problem, external fields. This is done sequentially such that the results of the mathematical model could be tested.

As result, we get an induction coil model with an aluminium workpiece, which, due to magnetic induction, melts. After external and coil magnetic fields are added, in the workpiece a pressure and volume force distribution is created, which leads to electromagnetic vibrations. Since the model will be created using a real induction coil, it could be further used in experiments with this coil.

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