

# PhD research topic proposal (template)

BME, Doctoral School of Mathematics and Computer Science

Name and degree of supervisors : József Kolumbán

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No

Title of the topic: Variational methods in magnetohydrodynamics

## Short description:

Magnetohydrodynamics concerns itself with the study of electrically conducting fluids in magnetic fields. There have been many recent mathematical results combining principles from fluid mechanics and electromagnetism to study various problems related to magnetohydrodynamics, such as magnetohydrodynamical turbulence or fluid-solid interaction in electrically conducting fluids. Potential applications range from modelling solar flairs or plasmas in reactors, to developing propulsion technologies by ionizing the environment around an object. The goal of the PhD thesis is to study certain modern problems from ideal magnetohydrodynamics which involve mathematical methods from calculus of variations, optimal control or control theory.

Requirements: Partial differential equations, functional analysis, calculus of variations

## Contact:

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## Place of work:

Department of Analysis and Operations Research, Budapest University of Technology and Economics