

## **Abstract**

The new generation of magnetorheological fluids (MRF's) offers a wide range of applicability in fluid mechatronics with automotive MRF devices such as MRF controllable clutches or breaks. The paper discusses a model of coupled electromagnetic, hydrodynamic and mechanical motion phenomena in magnetorheological fluid transducers with axial symmetry. The governing equations of these phenomena are presented. The numerical implementation of the mathematical model is based on the finite element method and a step-by-step algorithm. A computer program based on this algorithm was used to simulate the electromagnetic field and the fluid velocity field in a magnetorheological clutch. The results of the calculations are presented.