Mechanical and Numerical Analysis of Vehicle Parts Made of Electro Active Polymers

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Short description: The research topic deals with the numerical analysis of EAP materials. The first step of the research work is to formulate the governing equations for the case of large deformation. These equations are the Maxwell's equations, conservation of the linear and angular momentum, the first and the second law of thermodynamics. In the next step rheological models and constitutive equations have to be chosen to describe the behavior of the given material. If needed, some other kinematical constraints, e.g. incompressibility, also have to be considered. A new algorithm has to be developed for solving the coupled electro-mechanical or electro-thermo-mechanical problem. After that numerical computations are needed to decide what type of materials, what size and shapes of vehicle parts should be used in a more energy-efficient car.