1048-65-252 **Alexander Labovsky*** (ayl@math.missouri.edu) and **Catalin Trenchea** (trenchea@pitt.edu). *Approximate Deconvolution Models for MagnetoHydroDynamic Turbulence.* Preliminary report.

Magnetically conducting fluids arise in important applications including climate change forecasting, plasma confinement, controlled thermonuclear fusion, liquid-metal cooling of nuclear reactors, electromagnetic casting of metals, MHD sea water propulsion. In many of these, turbulent MHD (MagnetoHydroDynamic) flows are typical. The difficulties of accurately modeling and simulating turbulent flows are magnified many times over in the MHD case. They are evinced by the more complex dynamics of the flow due to the coupling of Navier-Stokes and Maxwell equations via the Lorentz force and Ohm's law. We consider the family of approximate deconvolution models (ADM) for the simulation of the large eddies in turbulent viscous, incompressible, electrically conducting flows. We prove existence and uniqueness of solutions, we prove that the solutions to the ADM-MHD equations converge to the solution of the MHD equations in a weak sense as the averaging radii converge to zero, and we derive a bound on the modeling error. We prove that the energy and helicity of the models are conserved, and the models preserve the Alfven waves. We provide the results of the computational tests, that verify the accuracy and physical fidelity of the models. (Received February 09, 2009)