

Abstract Submitted
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Constitutive upscaling of MR fluids GRIGOR NIKA, BOGDAN
VERNESCU, Worcester Polytech Inst — We consider a suspension of solid mag-
netizable particles in a viscous fluid with an applied external magnetic field. We
assume the fluid to be electrically non-conducting. Thus, we use the quasi-static
Maxwell equations coupled with the Stokes equations to capture the magnetorhe-
ological effect. We upscale using two scale asymptotic expansions to obtain the
effective equations consisting of a coupled nonlinear system in a connected phase
domain as well as the new constitutive laws. Qualitative properties of the solution
of this nonlinear system are studied.

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