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Fully three-dimensional time-resolved MHD simulations in wall bounded geometry WOUTER BOS, Ecole Centrale de Lyon - LMFA - CNRS, MATTHIEU LEROY, M2P2 - Aix Marseille University - CNRS, JORGE MORALES, Ecole Centrale de Lyon - LMFA - CNRS, KAI SCHNEIDER, M2P2 - CMI - Aix Marseille University - CNRS — We present a new method for computing 3D viscous-resistive MHD turbulence in wall bounded geometries of arbitrary shape [1]. The numerical scheme is based on a classical Fourier pseudo-spectral solver combined with a volume penalization method to impose the boundary condition of the velocity and magnetic field. The new code is validated using different test cases, such as three-dimensional Taylor-Couette flow and MHD in cylindrical geometry. Imposing helical magnetic boundary conditions in the latter geometry, the flow shows a self-organization to a chaotic state for elevated Hartmann number. In toroidal geometry, this self-organization leads to toroidal velocity fields.

[1] Morales, Leroy, Bos and Schneider (submitted).

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