

## **Auxiliary variational inequality principle and projection methods for MHD propulsion system**

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In this paper we show how one could extend Jones-Soward-Mussa (JSM) theory (2000): analytic and computational solution for  $E \rightarrow 0$  and  $Pr/E \rightarrow \infty$  and another MHD related problems e.g., Zhang (2001) ansatz for:  $E \ll 1$  arbitrary but fixed and  $0 \leq Pr < \infty$  the so-called enhanced Nearly Geostrophic Inertial Wave (NGIW) approach. Such extension represents a construction of a new MHD plasma convection and magnetoconvection force theory. Different theoretical and computational aspects are presented. We proposed the auxiliary variational inequality as well as the projection method as a replacement of asymptotic analysis for the solution of some complicated MHD as well as MHD turbulence and thruster problems. We also suggest some variational formulation extension for a similar class of mathematical and engineering problems.