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**Towards a stabilized finite element method for the MHD equations**[1] DAVID SONDAK, ASSAD OBERAI, Rensselaer Polytechnic Institute — In MHD flows with large Hartmann and/or Reynolds numbers the Galerkin finite element method does not perform well. It can be shown that in these limits this method looses stability and leads to solutions with spurious oscillations. In order to overcome this problem, we are developing a stabilized finite element method that is derived from a variational multiscale concept. This method introduces a model term to the Galerkin method that emulates the effect of the fine scales of the solution that are not captured by the grid. In doing so, these model terms add stability to the numerical method. In the case of turbulent MHD flows these terms can be interpreted as turbulence models that represent the effect of the fluctuating subgrid scales. In this presentation we will develop the stabilized finite element formulation and assess its performance with test problems.

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