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Mathematical Properties of the Flowing MHD Equilibrium Equations[1] M. MIAH, J. CARY, A. HAKIM, S. KRUGER, A. PLETZER, S. VADLAMANI, Tech-X Corporation — Experiments have observed significant toroidal and poloidal flows in their plasmas [1-3]. This has led to the need for a flowing equilibrium solver that is equipped to handle both fixed and free boundaries. In order to achieve this, the mathematical properties of the flow equilibrium equations need to be better understood. Difficulty arises when analyzing these equations since they are not only fully non-linear, but also the differential operator itself is coupled to an algebraic equation. We discuss the method and process used to formulate the equilibrium problem with flow effects in a computationally tractable form and the methods available to solve the resulting equations. Initial results from an implementation of the equilibrium equations are also presented.

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