

Abstract Submitted
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Verification of Least-Square Weighted Residual Methods for Solution of Global Model Equations¹ SERGEY AVERKIN, THOMAS JENKINS, Tech-X Corporation — In this work, we present a verification of a least-squares weighted residual method that allows us to efficiently approximate solutions of plasma fluid equations. In this model we choose a rational functional representation with undetermined coefficients to represent various plasma properties. We then determine these coefficients such that the L^2 norm of the residual of 1-D multi-fluid equations is minimized. Approximate plasma profiles can be obtained quickly and efficiently. In this work we focus on verification of the method by comparing our simulation results with analytical solutions of simplified fluid equations. We focus on cylindrical plasma discharges in a wide range of pressure regimes, without the heuristic approximations used by conventional global models. We also discuss the optimal order of polynomials used in our rational function representation relative to desired accuracy constraints, and quantify the error in our functional approximations.

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