

Abstract Submitted
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Status of BOUT fluid turbulence code: improvements and verification M.V. UMANSKY, L.L. LODESTRO, X.Q. XU, LLNL — BOUT is an electromagnetic fluid turbulence code for tokamak edge plasma [1]. BOUT performs time integration of reduced Braginskii plasma fluid equations, using spatial discretization in realistic geometry and employing a standard ODE integration package PVODE. BOUT has been applied to several tokamak experiments and in some cases calculated spectra of turbulent fluctuations compared favorably to experimental data. On the other hand, the desire to understand better the code results and to gain more confidence in it motivated investing effort in rigorous verification of BOUT. Parallel to the testing the code underwent substantial modification, mainly to improve its readability and tractability of physical terms, with some algorithmic improvements as well. In the verification process, a series of linear and nonlinear test problems was applied to BOUT, targeting different subgroups of physical terms. The tests include reproducing basic electrostatic and electromagnetic plasma modes in simplified geometry, axisymmetric benchmarks against the 2D edge code UEDGE in real divertor geometry, and neutral fluid benchmarks against the hydrodynamic code LCPFCT. After completion of the testing, the new version of the code is being applied to actual tokamak edge turbulence problems, and the results will be presented. [1] X. Q. Xu et al., *Contr. Plas. Phys.*, 36,158 (1998). *Work performed for USDOE by Univ. Calif. LLNL under contract W-7405-ENG-48.

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