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Simulations of plasma shape and vertical-instability control in KSTAR[1] L.L. LODESTRO, R.H. BULMER, W.H. MEYER, L.D. PEARLSTEIN, Lawrence Livermore National Laboratory — In recent years, prompted by applications to ITER, the Corsica code's capability for evolving free-boundary equilibria coupled to transport, in particular current-profile transport, has been improved. All active and passive material conductors (coils, conducting plates, vessel walls) in these calculations are represented as axisymmetric wires, coupled to each other and the plasma with circuit equations; up/down asymmetric elongated plasmas require a feedback circuit to control the vertical instability. The improvements include: completion of the facility for running Corsica as the plasma model in Matlab/Simulink simulations of the circuits, benchmarked against stand-alone Corsica simulations; development of a general machine-description data-base for importing or verifying a machine's conductor configurations; and modernization and generalization of the (scripted) algorithms that accomplish the couplings in Corsica, plus new features needed for ITER scenario development. The code has been used to assess the capability of ITER's in-vessel coils (VS3) and is presently being used for ITER control simulations. In this paper, we apply the code to KSTAR. We have updated the KSTAR machine description and will present simulations of plasma-shape and vertical-instability control.

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