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Stability analysis of resistive wall mode including effects of plasma rotation and error field.[1] MASARU FURUKAWA, Grad. Sch. Frontier Sci., Univ. Tokyo, LINJIN ZHENG, Inst. Fusion Studies, Univ. Texas at Austin — We have formulated the resistive wall mode stability analysis via an initial-value approach instead of the conventional normal- mode approach in order to resolve the critical rotation for stability and the braking problems. Plasma inertia and rotation are taken into account at a narrow layer around a rational surface. In the plasma region except for the layer, the Newcomb equation (inertia-less MHD equation) is solved. Then the solutions are matched across the narrow layer. In the vacuum region, the Laplace equation for the scalar potential of perturbed magnetic field is solved, and the solutions are connected across a thin resistive wall. In the resistive wall, the diffusion equation for the perturbed magnetic field is solved. Then, we obtain two evolution equations for the amplitude of the mode. The linear growth rates agree well with those obtained by the normal-mode approach. By coupling an evolution equation of the plasma rotation, which includes torque by the mode and error field, we can investigate the quasi-linear evolution.

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