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Nonlinear simulation of plasma disruption caused by resistive wall mode in a cylindrical tokamak MASAHIKO SATO, NORIYOSHI NAKAJIMA, National Institute for Fusion Science — Nonlinear behavior of resistive wall mode (RWM) has been studied using nonlinear three-dimensional simulation code based on the reduced MHD equations in a cylindrical tokamak. For the case that the RWM with (m,n)=(3,1) mode and the (m,n)=(5,2) mode are linearly unstable, the magnetic field line stochastization is obtained around the plasma edge, where m and n are poloidal and toroidal mode number, respectively. Even when the (m,n) = (2,1) tearing mode is linearly stable, the (m,n)=(2,1) mode rapidly grows by nonlinear mode coupling of (m,n)=(3,1) and (5,2) modes. Since the stochastization causes the changes of the current and resistivity profile, the (m,n)=(2,1) mode still grows after the saturation of the (m,n)=(3,1) and (5,2) modes. Finally, the energy of the (m,n)=(2,1) mode becomes predominant and the stochastic region covers all plasma region.

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