

Abstract Submitted
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A simple rigorous calculation of nonlinear tearing mode QIAN TENG, DAVID GATES, Princeton Plasma Physics Lab, MUNI ZHOU, Zhejiang University, ROSCOE WHITE, Princeton Plasma Physics Lab — The nonlinear growth of tearing mode is governed by the Modified Rutherford Equation. This equation can be readily solved numerically. However analytical solution provides more physical intuition and deeper understanding of the instability. R. B. White *et. al.* developed a quasilinear method in 1977 and N. Arcis *et. al.* used a perturbative method to solve the equation in 2006. In this work, we present a simple method to solve the nonlinear problem with Taylor expansion. We calculated $\Delta'_{classic}$, the discontinuity in the first derivative of the perturbed flux across the island, accurate to the second order. $\Delta'_{classic}$ is found to be dominated by three terms: constant Δ'_0 , w , and $wlnw$. This agrees with the results calculated with the perturbative method.

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