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A New Matching Method for the Resistive Wall Mode Analysis of Rotating Plasmas JUNYA SHIRAISHI, SHINJI TOKUDA, NOBUYUKI AIBA, Japan Atomic Energy Agency — Stabilization of the Resistive Wall Modes (RWMs) by the plasma rotation is one of the most important physical issues for future reactors operated in the advanced tokamak regime [1]. For rotating plasmas, the linear stability problem, which is governed by the Frieman-Rotenberg equation [2], becomes non-self-adjoint, thus the conventional normal mode decomposition is not complete. Therefore, in this study, a new matching method is proposed, which solves the Frieman-Rotenberg equation as an initial value problem. The new method divides the plasma region into outer regions and inner layers as in the conventional asymptotic matching method. The essential difference is that the inner layers of the new method have finite width, thus, the Newcomb equation governing the outer regions has no singularity. The matching condition is numerically satisfied such that the normal components of the Lagrangian displacement are smooth. The new method can study the rotation effect around rational surfaces with high numerical accuracy and short computation time. [1] M. Takechi et al., Phys. Rev. Lett. 98, 055002 (2007). [2] E. Frieman and M. Rotenberg, Rev. Mod. Phys. 32, 898 (1960).

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