抵抗性テアリング不安定性の磁気流体線形理論における粘性効果
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MHD linear theory of resistive tearing instability with viscosity effect.

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A new MHD linear theory of resistive tearing instability based on Loureiro theory (Phys.Plasmas,2007) is developed, introducing the viscosity effect. Originally, FKR theory (Furth Killeen Rosenbluth, Phys.Fluids,1963) well-known as a classical theory of resistive tearing instability is inapplicable for high speed, i.e. Alfvenic, tearing instability for uniform resistivity. This problem can be resolved on basis of Loureiro theory, where the perturbation in non-zero equilibrium plasma flow field and uniform resistivity is rigorously studied. In our previous study, it has been reported that the linear growth rate in Loureiro theory can reach a unit of the Alfven time scale as the upper limit. The Loureiro theory assumes the uniform resistivity but to be non-viscous. In this paper, introducing the viscosity effect in the Loureiro theory, it is shown that the growth rate is monotonically reduced as the viscosity increases but it suggests that the growth rate cannot be negative, i.e. stable. It suggests that tearing instability cannot be stable only for resistivity but also for viscosity, at least, in linear MHD theory.