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Category Number and Subject: 6.1.3 Plasma Control Systems or 5.6.2 DIII-D Tokamak

Theory Experiment

Comparison of RWM Stabilization Strategies in DIII-D, S. Yang, E. Schuster, *Lehigh U.*, D.A. Humphreys, M.L. Walker, *General Atomics*, Y. In, J-S. Kim, *FAR-TECH Inc.* – One of the major non-axisymmetric instabilities under study in the DIII-D tokamak is the resistive wall mode (RWM), a form of plasma kink instability whose growth rate is moderated by the influence of a resistive wall. The *FAR-TECH/General Atomics* RWM dynamic model represents the plasma surface as a toroidal current sheet and represents the wall using an eigenmode approach. This dynamic model is used for the design of model-based controllers that have the potential of outperforming present proportional-derivative (PD) controllers. We report on validation of this dynamic model, a required step before implementation of any model-based controller in the DIII-D plasma control system. In addition, simulation results are presented comparing the performance of advanced controllers synthesized using the validated dynamic model and present non-model-based PD controllers.

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