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Progress Towards Integrated Profile Control and NTM Suppression in DIII-D[1] ANDRES PAJARES, EUGENIO SCHUSTER, Lehigh University, DIII-D TEAM — New integrated control algorithms for the regulation of plasma profiles and scalar variables in conjunction with neoclassical tearing mode (NTM) suppression in DIII-D have been successfully tested in simulations. The Modified Rutherford Equation, which is used to estimate the NTM island width, has been integrated into the Control Oriented Transport SIMulator (COTSIM) and utilized for simulation-based testing of control algorithms based on robust feedback linearization and Lyapunov redesign techniques. These algorithms allow for controlling a combination of profiles (current, temperature, and/or pressure), scalar variables (central safety factor, q_0, edge safety factor, q_{edge}, stored energy, W, and bulk toroidal rotation, Ω_ϕ), and NTM island width. An actuator manager based on real-time optimization has been included to handle these competing control objectives. Previous [1] and on-going experimental efforts have the goal of further testing and ultimately validating the aforementioned integrated control architectures and tools within the DIII-D plasma control system. [1] A. Pajares et al., Integrated current profile, normalized beta and NTM control in DIII-D, Fusion Engineering and Design, 2019.

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