Current Saturation Avoidance with Real-Time Control using DPCS M. FERRARA, I. HUTCHINSON, S. WOLFE, J. STILLERMAN, T. FREDIAN, MIT PSFC — Tokamak ohmic-transformer and equilibrium-field coils need to be able to operate near their maximum current capabilities. However if they reach their upper limit during high-performance discharges or in the presence of a strong off-normal event, shape control is compromised, and instability, even plasma disruptions can result. On Alcator C-Mod we designed and tested an anti-saturation routine which detects the impending saturation of OH and EF currents and interpolates to a neighboring safe equilibrium in real-time. The routine was implemented with a multi-processor, multi-time-scale control scheme, which is based on a master process and multiple asynchronous slave processes. The scheme is general and can be used for any computationally-intensive algorithm. USDoE award DE- FC02-99ER545512.

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