

## **ANALOG FILTER DESIGN AND PERFORMANCE FOR THE DIII-D PLASMA CONTROL SYSTEM\***

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The digital plasma control system (PCS), currently in operation on the DIII-D tokamak, requires inputs from a large number of sensors. Due to the nature of the digitizers and the relative noisy environment from which these signals are derived, each of the 32 signals must be conditioned via an analog filter. There are two different types of filters, Chebyshev and Bessel each with fixed frequencies of operations:

- 100 Hz Bessel filters are used for filtering the motional Stark effect diagnostic data
- An 800 Hz Bessel filter was designed to filter plasma control data and
- A 1200 Hz Chebyshev filter is used with the closed loop control of the choppers

The performance of the plasma control system is greatly influenced by how well the actual filter responses match the software model used in the control system algorithms. This paper addresses the various issues facing the designer in matching the realities of electrical design practices with the theoretical models from which the specifications are derived.

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