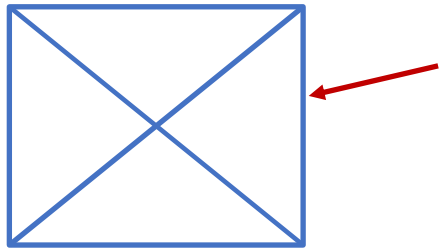
Proposal for Time Varying internal coils in M3D-C1 (Similar to what is done in TSC)

In the Grad-Shafranov solve, for the coil region solve:



Coil i with current I_i, area A_i, and resistivity η

$$\Delta^* \Psi = \mu_0 \frac{R I_i}{A_i}$$

For the time advance, for the coil region solve:

$$\frac{\partial}{\partial t}\Psi = \mu_0^{-1}\eta\Delta^*\Psi + (2\pi)^{-1}V(t)$$

Here, the voltage is given by a separate equation, in a feedback loop.
For example, a simple proportional feedback could be first used:

$$V(t) = \alpha_P \left(I_{desired} - I(t) \right)$$

This is readily extended to Proportional, Integral, Derivative (PID) feedback.