HBT-EP RWM Feedback Gain

Proportional Gain (Volt/Weber) and Derivative Gain (Volt/Volt)

\[ V_c = -G_p \Phi_s - G_D \Phi_s = -(G_p + i\omega G_D)\Phi_s \]

 Flux Gain (Weber/Weber)

\[ \Phi_c = -\alpha\Phi_s \]
\[ \alpha = \frac{M'_{sc}(G_p + i\omega G_D)}{Z'_c} \]

Feedback Reduction

\[ \frac{\Phi_s}{\Phi_{ext}} = \frac{1}{1 + \alpha} \]
HBT-EP RWM Feedback Coil Characteristics

Resistive Wall
- $\tau_{w1}=77 \, \mu s$
- $f_{w1}=2.1 \, kHz$

- $\tau_{w2}=12.7 \, \mu s$
- $f_{w2}=12.6 \, kHz$

Feedback Coils
- $L_c=170 \, \mu H$
- $R_c=3.6 \, \Omega$
- $\tau_c=47 \, \mu s$
- $f_c=3.3 \, kHz$
- $M_{sc}=41 \, \mu H$

Effective Control Coil Impedance (Ohms)

$$Z'_c = \frac{V_c}{I_c}$$

Effective Mutual Inductance between Control and Sensor Coils (H)

$$M'_{sc} = \frac{V_s}{I_c}$$

Frequency (Hz)