TriCopter Snono Project

Scheduling of thrusters against thrust loss

September 2024

1 Equations for Thrust Loss Compensation

1.1 Motor 1 (Front)

Note on S_8 range: Set to be from minimum tilt to maximum tilt in radians.

Note on S_3, S_4 ranges: These are normalized to be from -1 to 1.

Expanded form (as in code):

$$M_1 := M_1 + \left(\frac{M_1}{\cos(S_8)} - M_1\right) + \left(\frac{M_1}{\cos\left((\alpha_{can}/2)S_3\right)} - M_1\right) + \left(\frac{M_1}{\cos\left((\alpha_{can}/2)S_4\right)} - M_1\right)$$

Compact form:

$$M_1 := M_1\left(\frac{1}{\cos(S_8)} + \frac{1}{\cos\left((\alpha_{can}/2)S_3\right)} + \frac{1}{\cos\left((\alpha_{can}/2)S_4\right)} - 2\right)$$

1.2 Motor 2 (Right)

Note on S_6, S_7 ranges: These are normalized to be from -1 to 1.

Expanded form (as in code):

$$M_2 := \frac{M_2}{\cos(\alpha_{vane} S_6)}$$

1.3 Motor 3 (Left)

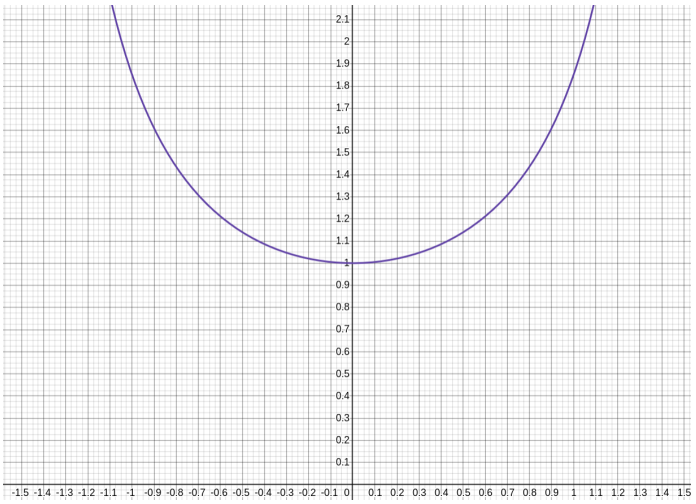
Expanded form (as in code):

$$M_3 := \frac{M_3}{\cos(\alpha_{vane} S_7)}$$

2 Reference plots for a few compensation functions

2.1 Secant (cosine reciprocal)

$$y = \frac{1}{\cos x}$$



2.2 Linear (Absolute)

$$y = 1 + |x|$$