Error Propagation: given $R(x_1, x_2 \ldots x_n)$, and where W_R is the error in R,

$$W_R = \sqrt{\sum_{i=1}^{n} \left(\frac{\partial R}{\partial x_i} W_{x_i}\right)^2}$$ This is used in the MATLAB code.

Wing Area ($S = cb$): $$S_{err} = \sqrt{(c \cdot b_{err})^2 + (b \cdot c_{err})^2}$$

Dynamic Pressure ($q = \frac{1}{2}\rho v^2$): $$q_{err} = \sqrt{\left(\tfrac{1}{2}v^2 \rho_{err}\right)^2 + (\rho v \cdot v_{err})^2}$$

Lift ($L = -F_a \sin\alpha + F_n \cos\alpha$): $$L_{err} = \sqrt{(-F_{a_{err}} \sin\alpha)^2 + (F_{n_{err}} \cos\alpha)^2 + [(-F_a \cos\alpha - F_n \sin\alpha)\alpha_{err}]^2}$$

Drag ($D = F_a \cos\alpha + F_n \sin\alpha$): $$D_{err} = \sqrt{(+F_{a_{err}} \cos\alpha)^2 + (F_{n_{err}} \sin\alpha)^2 + [(F_a \sin\alpha + F_n \cos\alpha)\alpha_{err}]^2}$$

C_L ($C_L = \frac{L}{qS}$): $$C_{L_{err}} = \sqrt{\left(\frac{L_{err}}{qS}\right)^2 + \left(-\frac{L}{q^2 S} q_{err}\right)^2 + \left(-\frac{L}{qS^2} S_{err}\right)^2}$$

C_D ($C_D = \frac{D}{qS}$): $$C_{D_{err}} = \sqrt{\left(\frac{D_{err}}{qS}\right)^2 + \left(-\frac{D}{q^2 S} q_{err}\right)^2 + \left(-\frac{D}{qS^2} S_{err}\right)^2}$$

Re ($Re = \frac{\rho v_\infty c}{\mu}$): $$Re_{err} = \sqrt{\left(\frac{v_\infty c}{\mu}\rho_{err}\right)^2 + \left(\frac{\rho c}{\mu} v_{\infty_{err}}\right)^2 + \left(\frac{\rho v_\infty}{\mu} c_{err}\right)^2 + \left(-\frac{\rho v_\infty c}{\mu^2}\mu_{err}\right)^2}$$

L_o ($L_o = L - x\sin\alpha$): $$L_{o_{err}} = \sqrt{(-x\sin\alpha \cdot L_{err})^2 + [(L - \sin\alpha)x_{err}]^2 + [(L - x\cos\alpha)\alpha_{err}]^2}$$

$\frac{L_o - Y}{Y}$: $$\text{len\_scale}_{err} = \sqrt{\left(\frac{Y L_{o_{err}}}{L_o^2}\right)^2 + \left(\frac{-Y_{err}}{L_o}\right)^2}$$

In Spreadsheet King's Law Calibration, RMSE was calculated as such: $RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(\text{Predicted}_i - \text{Actual}_i)^2}$

King's Law fit

Lab data