$$\alpha = \frac{d}{2L_i}\frac{\partial\theta}{\partial t}$$, sea $m = \frac{\partial\theta}{\partial t} \Rightarrow \alpha = \frac{d}{2L_i} m$

$$\sigma_\alpha = \sqrt{\left(\frac{\partial\alpha}{\partial d}\sigma_d\right)^2 + \left(\frac{\partial\alpha}{\partial L_i}\sigma_{L_i}\right)^2 + \left(\frac{\partial\alpha}{\partial m}\sigma_m\right)^2}$$

Ahora

$\frac{\partial\alpha}{\partial d} = \frac{1}{2L_i} m$; $\frac{\partial\alpha}{\partial L_i} = -\frac{d}{2L_i^2} m$; $\frac{\partial\alpha}{\partial m} = \frac{d}{2L_i}$, entonces

$$\sigma_\alpha = \sqrt{\left(\frac{m}{2L_i}\sigma_d\right)^2 + \left(-\frac{d}{2L_i^2} m\sigma_{L_i}\right)^2 + \left(\frac{d}{2L_i}\sigma_m\right)^2}$$

Sabemos que, $\sigma_d = 0.001\,cm$, $\sigma_{L_i} = 1\,cm$, $\sigma_m = 0.0004\,rad/s$ y

$d = 0.080\,cm$, $L_i = 50\,cm$, $m = 0.0020\,rad/s$, entonces reemplazamos

$$\sigma_\alpha = \sqrt{\left(\frac{0.0020\,rad/s}{2\cdot 50\,cm}0.001\,cm\right)^2 + \left(-\frac{0.080\,cm}{2(50\,cm)^2}\cdot 0.0020\,rad/s\cdot 1\,cm\right)^2 + \left(\frac{0.080\,cm}{2\cdot 50\,cm}\cdot 0.0004\,rad/s\right)^2}$$

$$\sigma_\alpha = \sqrt{4\cdot 10^{-16}\,rad^2/s^2 + 1.024\cdot 10^{-15}\,rad^2/s^2 + 1.024\cdot 10^{-13}\,rad^2/s^2}$$

$$\sigma_\alpha = 3.22\cdot 10^{-7}\,rad/s$$

Ahora:

$$\alpha = \frac{0.080\,cm}{2\cdot 50\,cm}\cdot 0.0020\,rad/s \Rightarrow \alpha = 1.6\cdot 10^{-6}\,rad/s$$

Por lo tanto,

$$\alpha = (1.6\cdot 10^{-6} \pm 3.22\cdot 10^{-7})\,rad/s$$