

- NWODO CHUBIKE WILLIAM
- 17/ENG05/023
- MECHATRONICS ENGINEERING

$$\Rightarrow A = \frac{1}{2}ab = \frac{a \cdot b}{2}$$

$$\frac{dA}{da} = \frac{b}{2}, \quad \frac{dA}{db} = \frac{a}{2}$$

$$\delta a = \pm \frac{3a}{200}, \quad \delta b = \pm \frac{3b}{200}$$

$$\begin{aligned} \delta A &= \frac{dA}{da} \cdot \delta a + \frac{dA}{db} \cdot \delta b \\ &= \frac{b}{2} \left(\pm \frac{3a}{200} \right) + \frac{a}{2} \left(\pm \frac{3b}{200} \right) \\ &= \frac{\pm a \cdot b}{2} \left[\frac{3}{200} + \frac{3}{200} \right] = \frac{\pm A \cdot 3}{100} \end{aligned}$$

$$\therefore \delta A = 3 \text{ percent of } A$$

$$a) \quad C = \sqrt{a^2 + b^2} = (a^2 + b^2)^{1/2}$$

$$\frac{dC}{da} = \frac{1}{2} (a^2 + b^2)^{-1/2} (2a)$$

$$= \frac{a}{\sqrt{a^2 + b^2}}$$

$$\frac{dC}{db} = \frac{1}{2} (a^2 + b^2)^{-1/2} (2b)$$

$$= \frac{b}{\sqrt{a^2 + b^2}}$$

$$\delta a = \pm \frac{3a}{200}, \quad \delta b = \pm \frac{3b}{200}$$

$$\begin{aligned} \therefore \delta C &= \frac{dC}{da} \cdot \delta a + \frac{dC}{db} \cdot \delta b \\ \delta C &= \frac{a}{\sqrt{a^2 + b^2}} \left(\pm \frac{3a}{200} \right) + \frac{b}{\sqrt{a^2 + b^2}} \left(\pm \frac{3b}{200} \right) \\ &= \pm \frac{3}{200} \cdot \sqrt{a^2 + b^2} \end{aligned}$$

$$= \pm \frac{3}{200} \cdot C$$
$$\therefore \delta C = 1.5\% \text{ of } C$$