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Mechatronics Engineering
17/ENG05/1012

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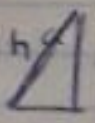

Area of $\Delta = \frac{1}{2}ab$

$A = \frac{a \cdot b}{2}$ $\quad \partial a = \frac{1.5}{100} \times a$, $\partial b = \frac{1.5}{100} \times b$

$\partial A/\partial a = b/2$ $\quad \partial A/\partial b = a/2$

$\partial A = \partial A/\partial a \cdot \partial a + \partial A/\partial b \cdot \partial b$

$\partial A = b/2 \cdot \frac{15a}{1000} + a/2 \cdot \frac{15b}{1000}$

$\partial A = \frac{a \cdot b}{2}\left[\frac{15}{1000} + \frac{15}{1000}\right]$

$\partial A = \frac{a \cdot b}{2}\left[\frac{30}{1000}\right]$

∂A = Recall $\frac{a \cdot b}{2} = A$

Therefore
$\partial A = A \times 3/100$

∂A = 3 percent of A

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

u

$\partial c / \partial a =$

Let $u = a^2 + b^2$ $\quad c = u^{1/2}$

$du/da = 2a$ $\quad dc/du = \frac{1}{2} u^{-1/2}$

$du/db = 2b$

$du/da \times dc/du = \frac{1}{2} u^{1/2} \times a$

$du/db \times dc/du = \frac{1}{2} u^{1/2} \times b$

$dc/da = a(a^2 + b^2)^{-1/2}$

$dc/db = b(a^2 + b^2)^{-1/2}$

$\partial c = \partial c/\partial a \cdot \partial a + \partial c/\partial b \cdot \partial b$

Note

$\partial a = \frac{1.5}{100} \times a$

$\partial b = \frac{1.5}{100} \times b$

$\partial c = a(a^2 + b^2)^{-1/2} \frac{1.5}{100} a + b(a^2 + b^2)^{-1/2} \frac{1.5}{100} b$

$$\partial c = \frac{a^2}{\sqrt{a^2+b^2}}\left(\frac{1.5}{100}\right) + \frac{b^2}{\sqrt{a^2+b^2}}\left(\frac{1.5}{100}\right)$$

$$\partial c = \frac{1.5}{100}\left(\frac{a^2}{\sqrt{a^2+b^2}} + \frac{b^2}{\sqrt{a^2+b^2}}\right)$$

$$\partial c = \frac{1.5}{100} \quad \frac{a^2+b^2}{\sqrt{a^2+b^2}}$$

$$\partial c = \frac{1.5}{100} \quad \frac{(a^2+b^2)^1}{(a^2+b^2)^{1/2}}$$

$$\partial c = \frac{1.5}{100} \times (a^2+b^2)^{1} \div (a^2+b^2)^{1/2}$$

$$\partial c = \frac{1.5}{100} \times (a^2+b^2)^{1/2}$$

∂c = Recall

$$c = (a^2+b^2)^{1/2}$$

Therefore

$$dc = \frac{1.5}{100} \times c$$

dc = 1.5 percent of c