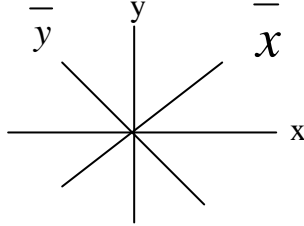
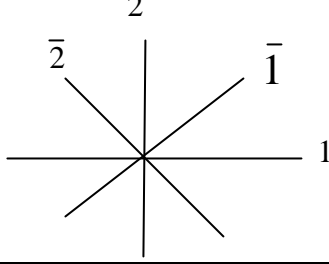


Moment of inertia <數學版與靜、動、材力之比較>

Engineering moment of inertia	Mathematical moment of inertia
	
<p>&lt;Definition&gt;</p> $I_{xx} = \int_A y^2 dA$ $I_{yy} = \int_A x^2 dA$ $I_{xy} = \int_A xy dA$ $I_{yx} = \int_A yx dA$	<p>&lt;Definition&gt;</p> $I_{ij} = \iint_A (r^2 \mathbf{d}_{ij} - x_i x_j) dA$ $I_{11} = \int_A x_2^2 dA$ $I_{22} = \int_A x_1^2 dA$ $I_{12} = -\int_A x_1 x_2 dA$ $I_{21} = -\int_A x_2 x_1 dA$
<p>&lt;Relation&gt;</p> $\bar{I}_{xx} = I_{xx} \cos^2 \mathbf{q} + I_{yy} \sin^2 \mathbf{q} - 2I_{xy} \sin \mathbf{q} \cos \mathbf{q}$ $\bar{I}_{yy} = I_{xx} \sin^2 \mathbf{q} + I_{yy} \cos^2 \mathbf{q} + 2I_{xy} \sin \mathbf{q} \cos \mathbf{q}$ $\bar{I}_{xy} = I_{xx} \sin \mathbf{q} \cos \mathbf{q} - I_{yy} \sin \mathbf{q} \cos \mathbf{q} + I_{xy} (\cos^2 \mathbf{q} - \sin^2 \mathbf{q})$	<p>&lt;Relation&gt;</p> $\bar{I}_{11} = I_{11} \cos^2 \mathbf{q} + I_{22} \sin^2 \mathbf{q} + 2I_{12} \sin \mathbf{q} \cos \mathbf{q}$ $\bar{I}_{22} = I_{11} \sin^2 \mathbf{q} + I_{22} \cos^2 \mathbf{q} - 2I_{12} \sin \mathbf{q} \cos \mathbf{q}$ $\bar{I}_{12} = -I_{11} \sin \mathbf{q} \cos \mathbf{q} + I_{22} \sin \mathbf{q} \cos \mathbf{q} + I_{12} (\cos^2 \mathbf{q} - \sin^2 \mathbf{q})$
<p>?</p>	$\begin{bmatrix} \bar{I}_{11} & \bar{I}_{12} \\ \bar{I}_{21} & \bar{I}_{22} \end{bmatrix} = \begin{bmatrix} \cos \mathbf{q} & \sin \mathbf{q} \\ -\sin \mathbf{q} & \cos \mathbf{q} \end{bmatrix} \begin{bmatrix} I_{11} & I_{12} \\ I_{21} & I_{22} \end{bmatrix} \begin{bmatrix} \cos \mathbf{q} & \sin \mathbf{q} \\ -\sin \mathbf{q} & \cos \mathbf{q} \end{bmatrix}^T$
<p>參考文獻 Gere 材力課本</p>	<p>海大河工系 工數 陳正宗講義</p>

Feb.27/2004 註：(工程剪應變與剪應變張量亦有差異)

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