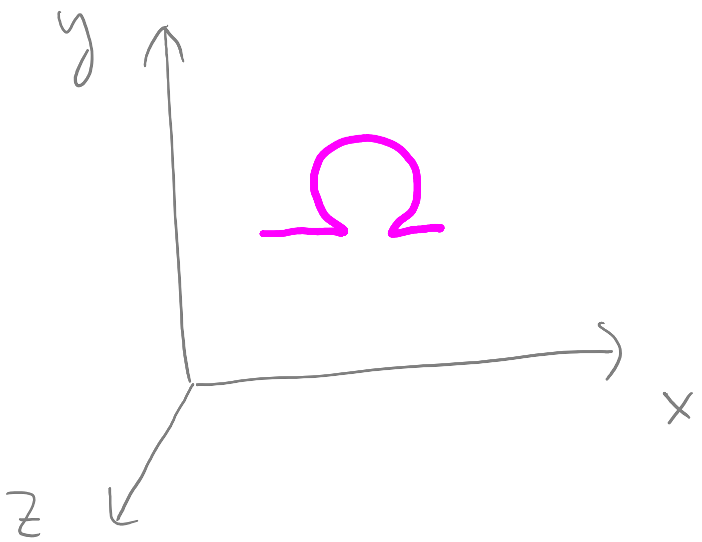
$$\left(\left(\bar{\bar{A}}^{T}\right)^{-1}\cdot\bar{\bar{A}}^{T}\right)^{T}=\bar{\bar{I}}^{T}$$

$$\underbrace{\bar{\bar{A}}^{TT}}_{\bar{\bar{A}}}\cdot\left(\left(\bar{\bar{A}}^{T}\right)^{-1}\right)^{T}=\bar{\bar{I}} \qquad \Big|\ \bar{\bar{A}}^{-1}\cdot$$

$$\bar{\bar{I}}\cdot\underbrace{(\quad)^{T}}=\bar{\bar{A}}^{-1}$$

$$\underbrace{(\quad)}_{\left(\bar{\bar{A}}^{T}\right)^{-1}}=\left(\bar{\bar{A}}^{-1}\right)^{T}$$



$$\bar{\bar{\zeta}}=\begin{pmatrix}0&0&0\\0&0&0\\\Omega&0&0\end{pmatrix}$$

$\Omega\,\bar{u}_z\bar{u}_x$

$$\bar{\bar{\mu}}^{-1} \cdot \left(\bar{B} = \bar{\bar{\mu}} \cdot \bar{H} + \bar{\bar{\zeta}} \cdot \bar{E} \right)$$

$$\bar{H} = \bar{\bar{\mu}}^{-1} \cdot \bar{B} - \bar{\bar{\mu}}^{-1} \cdot \bar{\bar{\zeta}} \cdot \bar{E}$$

$$\bar{D} = \bar{\bar{\varepsilon}} \cdot \bar{E} + \bar{\bar{\xi}} \cdot \left(\bar{\bar{\mu}}^{-1} \cdot \bar{B} - \bar{\bar{\mu}}^{-1} \cdot \bar{\bar{\zeta}} \cdot \bar{E} \right)$$

$$= \left(\bar{\bar{\varepsilon}} - \bar{\bar{\xi}} \cdot \bar{\bar{\mu}}^{-1} \cdot \bar{\bar{\zeta}} \right) \cdot \bar{E} + \bar{\bar{\xi}} \cdot \bar{\bar{\mu}}^{-1} \cdot \bar{B}$$

$$\bar{\bar{A}} \qquad \bar{\bar{B}} = c \bar{\bar{A}}$$

$$\bar{\bar{A}} \cdot \bar{\bar{B}} = \bar{\bar{A}} \cdot c \bar{\bar{A}}$$

$$\bar{\bar{A}} = \bar{u}_y \bar{u}_x \qquad \bar{\bar{B}} = \bar{u}_y \bar{u}_y$$

$$\bar{\bar{A}} = \bar{u}_x \bar{u}_x + 2 \bar{u}_y \bar{u}_y \qquad \bar{\bar{B}} = \bar{u}_x \bar{u}_y + \bar{u}_y \bar{u}_x$$

$$\bar{\bar{A}} \cdot \bar{\bar{B}} = \bar{u}_x \bar{u}_y + 2 \bar{u}_y \bar{u}_x$$

$$\bar{\bar{B}} \cdot \bar{\bar{A}} = 2 \bar{u}_x \bar{u}_y + \bar{u}_y \bar{u}_x$$

$$\bar{\bar{A}} \cdot \bar{x} = \lambda \bar{x}$$

$$\downarrow \; \lambda_1 \bar{u}\bar{u} + \lambda_2 \bar{v}\bar{v} + \lambda_3 \bar{w}\bar{w}$$

$$\bar{\bar{B}} = \beta_1 \bar{u}\bar{u} + \beta_2 \bar{v}\bar{v} + \beta_3 \bar{w}\bar{w}$$

$$\bar{\bar{A}} \cdot \bar{\bar{B}} = \lambda_1 \beta_1 \bar{u}\bar{u} + \lambda_2 \beta_2 \bar{v}\bar{v} + \lambda_3 \beta_3 \bar{w}\bar{w} = \bar{\bar{B}} \cdot \bar{\bar{A}}$$

$$\det(\bar{\bar{A}}\cdot\bar{\bar{B}}) = \det\bar{\bar{A}}\cdot\det\bar{\bar{B}}$$

$$(\bar{\bar{A}}\overset{\times}{\times}\bar{\bar{B}})\cdot(\bar{\bar{C}}\overset{\times}{\times}\bar{\bar{D}}) = (\bar{\bar{A}}\cdot\bar{\bar{C}})\overset{\times}{\times}(\bar{\bar{B}}\cdot\bar{\bar{D}}) + (\bar{\bar{A}}\cdot\bar{\bar{D}})\overset{\times}{\times}(\bar{\bar{B}}\cdot\bar{\bar{C}})$$

$$\bar{a}_1\bar{a}_2\overset{\times}{\times}\bar{b}_1\bar{b}_2\cdot\bar{c}_1\bar{c}_2\overset{\times}{\times}\bar{d}_1\bar{d}_2$$

$$(\bar{a}_1\times\bar{b}_1)\underbrace{(\bar{a}_2\times\bar{b}_2)\cdot(\bar{c}_1\times\bar{d}_1)}_{\bar{a}_2\cdot(\bar{c}_1\,\bar{b}_2\cdot\bar{d}_1-\bar{d}_1\,\bar{b}_2\cdot\bar{c}_1)}(\bar{c}_2\times\bar{d}_2)$$

$$(\bar{a}_1\bar{a}_2\cdot\bar{d}_1\bar{d}_2)\overset{\times}{\times}(\bar{b}_1\bar{b}_2\cdot\bar{c}_1\bar{c}_2)$$

$$(\bar{a}_2\cdot\bar{d}_1)(\bar{b}_2\cdot\bar{c}_1)(\bar{a}_1\times\bar{b}_1)(\bar{d}_2\times\bar{c}_2)$$

$$(\bar{\bar{A}}\overset{\times}{\times}\bar{\bar{A}})\cdot(\bar{\bar{B}}\overset{\times}{\times}\bar{\bar{B}}) = 2\,(\bar{\bar{A}}\cdot\bar{\bar{B}})\overset{\times}{\times}(\bar{\bar{A}}\cdot\bar{\bar{B}})$$

$$\bar{\bar{D}}^{(2)} = \frac{1}{2}\bar{\bar{D}}\overset{\times}{\times}\bar{\bar{D}}$$

$$\Rightarrow\quad \bar{\bar{A}}^{(2)}\cdot\bar{\bar{B}}^{(2)} = (\bar{\bar{A}}\cdot\bar{\bar{B}})^{(2)}$$

$$\bar{\bar{D}}^{-1} = \frac{\bar{\bar{D}}^{(2)T}}{\det\bar{\bar{D}}}$$

$$(\bar{\bar{A}}\cdot\bar{\bar{B}})^{-1} = \frac{(\bar{\bar{A}}\cdot\bar{\bar{B}})^{(2)T}}{\det(\bar{\bar{A}}\cdot\bar{\bar{B}})} = \frac{(\bar{\bar{A}}^{(2)}\cdot\bar{\bar{B}}^{(2)})^{T}}{\det(\bar{\bar{A}}\cdot\bar{\bar{B}})} = \frac{\bar{\bar{B}}^{(2)T}\cdot\bar{\bar{A}}^{(2)T}}{\det(\bar{\bar{A}}\cdot\bar{\bar{B}})}$$

$$= \bar{\bar{B}}^{-1}\cdot\bar{\bar{A}}^{-1}$$

$$= \frac{\bar{\bar{B}}^{(2)T}}{\det\bar{\bar{B}}}\cdot\frac{\bar{\bar{A}}^{(2)T}}{\det\bar{\bar{A}}}$$

$$\bar{\bar{A}} = \alpha \bar{\bar{I}} + \bar{a} \times \bar{\bar{I}}$$

$\underset{\times}{\times}$ $\quad$ $:$

$$\bar{\bar{I}} \underset{\times}{\times} \bar{\bar{I}} = 2 \bar{\bar{I}}$$

$$\bar{\bar{I}} \underset{\times}{\times} \bar{a} \times \bar{\bar{I}} = \bar{a} \times \bar{\bar{I}}$$

$$\bar{a} \times \bar{\bar{I}} \underset{\times}{\times} \bar{a} \times \bar{\bar{I}} = 2 \bar{a}\bar{a}$$

$$\bar{\bar{I}} : \bar{\bar{I}} = 3$$

$$\bar{a} \times \bar{\bar{I}} : \bar{\bar{I}} = 0$$

$$\bar{a} \times \bar{\bar{I}} : \bar{a} \times \bar{\bar{I}} = -tr \left(\overbrace{\bar{a} \times \bar{\bar{I}} \cdot \bar{a} \times \bar{\bar{I}}}^{\bar{a}\bar{a} - \bar{a} \cdot \bar{a} \bar{\bar{I}}} \right) = 2 \bar{a} \cdot \bar{a}$$

$$tr \left(\bar{\bar{A}} \cdot \bar{\bar{B}} \right) = \bar{\bar{A}} : \bar{\bar{B}}^T$$

$$\bar{\bar{A}} \underset{\times}{\times} \bar{\bar{I}} = tr\bar{\bar{A}} \, \bar{\bar{I}} - \bar{\bar{A}}^T$$

$$(\bar{a} \times \bar{\bar{I}}) \underset{\times}{\times} \bar{\bar{I}} = \bar{a} \times \bar{\bar{I}}$$

$$\overline{\overline{A}} \underset{\times}{\times} \overline{\overline{B}} =$$

$$[(\overline{\overline{A}} : \overline{\overline{I}})(\overline{\overline{B}} : \overline{\overline{I}}) - \overline{\overline{A}} : \overline{\overline{B}}^T]\overline{\overline{I}} - (\overline{\overline{A}} : \overline{\overline{I}})\overline{\overline{B}}^T - (\overline{\overline{B}} : \overline{\overline{I}})\overline{\overline{A}}^T + (\overline{\overline{A}} \cdot \overline{\overline{B}} + \overline{\overline{B}} \cdot \overline{\overline{A}})^T. \quad (2.51)$$

$$\bar{\bar{A}} \underset{\times}{\times} \bar{\bar{A}} = \left(tr^2 \bar{\bar{A}} - tr \bar{\bar{A}}^2 \right) \bar{\bar{I}} - 2 tr\bar{\bar{A}} \, \bar{\bar{A}}^T + 2 \bar{\bar{A}}^{2T}$$

$$\bar{a} \times \bar{\bar{I}} \underset{\times}{\times} \bar{a} \times \bar{\bar{I}} = 2 \bar{a} \cdot \bar{a} \, \bar{\bar{I}} + 2 \left(\bar{a}\bar{a} - \bar{a} \cdot \bar{a} \bar{\bar{I}} \right)$$

$$= 2 \bar{a}\bar{a}$$