si $\det T \neq 0 \Rightarrow \exists\ T^{-1} / TT^{-1} = I$

y $\lambda \neq 0$;

$$\det(T^{-1} - \lambda^{-1} I) =$$

$$= \det(T^{-1} - \lambda^{-1} T T^{-1}) =$$

$$= \det((I - \lambda^{-1} T) T^{-1}) =$$

$$= \det(I - \lambda^{-1} T) \underbrace{\det(T^{-1})}_{\neq 0} =$$

$$= \frac{1}{\det(T)} \det\left(\frac{T - \lambda I}{-\lambda}\right) \Rightarrow = \underbrace{\frac{-1}{\lambda^3 \det(T)}}_{\neq 0} \underbrace{\det(T - \lambda I)}_{= 0}$$

$$= 0$$

Ec. caract.

$$\lambda^{-3} - I_1(T^{-1})\lambda^{-2} + I_2(T^{-1})\lambda^{-1} - I_3(T^{-1})$$

$$= 0$$

Cayley-Hamilton

$$\underline{\underline{T}}^3 - I_1(\underline{\underline{T}})\,\underline{\underline{T}}^2 + I_2(\underline{\underline{T}})\,\underline{\underline{T}} - I_3(\underline{\underline{T}})\,\underline{\underline{I}} = 0$$

$$\times\,\underline{\underline{T}}^{-1}:\quad \underline{\underline{T}}^2 - I_1\underline{\underline{T}} + I_2\underline{\underline{I}} - I_3\underline{\underline{T}}^{-1} = 0$$

$$\underline{\underline{T}}^{-1} = \frac{1}{I_3}\left(\underline{\underline{T}}^2 - I_1\underline{\underline{T}} + I_2\underline{\underline{I}}\right)$$

$$I_i = I_i(\underline{\underline{T}})$$

$$I_1(\underline{\underline{T}}^{-1}) = \frac{1}{I_3}\,tr(\underline{\underline{T}}^2) - \frac{I_1}{I_3}\underbrace{tr(\underline{\underline{T}})}_{I_1} + \frac{I_2}{I_3}\underbrace{tr(\underline{\underline{I}})}_{=3}$$

$$I_1(T^{-1}) = \boxed{\frac{1}{I_3}\,tr(T^2) - \frac{I_1^2}{I_3}} + 3\,\frac{I_2}{I_3} = \frac{I_2}{I_3}$$

$\rightarrow -2\,I_2/I_3$

$$I_2 = \frac{1}{2}\left\{\left[\underbrace{tr(T)}_{I_1}\right]^2 - tr(T^2)\right\}$$

$$T^{-1} = \frac{1}{I_3}\left(T^2 - I_1 T + I_2 I\right) \qquad (1)$$

$$I_2\left(T^{-1}\right) = \frac{1}{2}\left[\underbrace{tr^2\left(T^{-1}\right)}_{\left(I_1\left(T^{-1}\right)\right)^2} - tr\left(T^{-2}\right)\right]$$

$$(1) \times T^{-1} \Rightarrow T^{-2} = \frac{1}{I_3}\left(T - I_1 I + I_2 T^{-1}\right)$$

$$tr\left(T^{-2}\right) = \frac{1}{I_3}\left(I_1 - 3 I_1 + \frac{I_2^2}{I_3}\right) = -2\frac{I_1}{I_3} + \left(\frac{I_2}{I_3}\right)^2$$

Si $ST = TS \underset{\not\Rightarrow}{\Leftarrow}$ S y T coaxiales

$$S = \sum_i s_i \, u^{(i)} \otimes u^{(i)} \qquad u^{(i)} = v^{(i)}$$

$$T = \sum_i t_i \, v^{(i)} \otimes v^{(i)}$$

$$S v^{(i)} = s_i v^{(i)} \rightarrow \text{No suma en } i$$

$$\left.\begin{aligned} T(S v^{(i)}) &= s_i \underbrace{T v^{(i)}} = s_i t_i v^{(i)} \\ S(T v^{(i)}) &= t_i s_i v^{(i)} \end{aligned}\right\} \Rightarrow TS = ST$$

$$T = \begin{bmatrix} 2{,}5 & -0{,}5 & 0 \\ -0{,}5 & 2{,}5 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

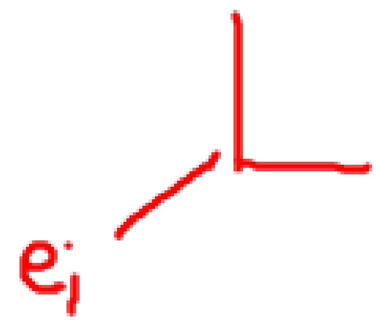
$$Q_{ij} = e'_i \cdot e_j$$

$$e'_i = v^{(i)}$$

$$\lambda_1 = 2 \ , \ v^{(1)} = \begin{bmatrix} -\sqrt{2}/2 \\ -\sqrt{2}/2 \\ 0 \end{bmatrix}$$

$$\lambda_{\cancel{2}\,3} = 3 \ , \ v^{(\cancel{2})\,3} = \begin{bmatrix} -\sqrt{2}/2 \\ \sqrt{2}/2 \\ 0 \end{bmatrix}$$

$$\lambda_{\cancel{3}\,2} = 4 \Rightarrow v^{(\cancel{3})\,2} = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$



$$T'_{ij} = Q_{ik} Q_{jl} T_{kl}$$

$$Q_{ij} = e'_i \cdot e_j = \left[V^{(i)}\right]_j$$

$$\Rightarrow \quad Q = \begin{bmatrix} V^{(1)T} \\ \hline V^{(2)T} \\ \hline V^{(3)T} \end{bmatrix} \qquad Q^T = \left[\begin{array}{c|c|c} V^{(1)} & V^{(2)} & V^{(3)} \\ \vdots & & \vdots \end{array}\right]$$

$$T'_{ij} = Q_{ik} Q_{jl} T_{kl} = Q_{ik} T_{kl} Q^T_{lj} = \left[Q T Q^T\right]_{ij}$$

$$I_2(T^{-1}) = \frac{1}{2}\left[\cancel{\left(\frac{I_2}{I_3}\right)^2} - \cancel{\left(\frac{I_2}{I_3}\right)^2} + 2\,\frac{I_1}{I_3}\right] = \frac{I_1}{I_3}$$

$$I_3(T^{-1}) = \det(T^{-1}) = \frac{1}{\det(T)} = \frac{1}{I_3}$$