Note : $tr(\underline{C}) = tr(\underline{b})$

$$\psi = \frac{\mu}{2}\left[tr(\underline{C}) - dim - 2\ln(J)\right] + \lambda \ln^2(J) \quad ; \quad S = 2\frac{d\psi}{d\underline{C}}, \quad \mathbb{H} = 4.\frac{d^2\psi}{d\underline{C}\otimes d\underline{C}}$$

$$\frac{dJ}{dC} = \frac{1}{2} J \underline{C}^{-1} \qquad \frac{dC^{-1}}{dC} \Rightarrow \left[\frac{dC^{-1}}{dC}\right]_{ABCD} = -\frac{1}{2}\left[C^{-1}_{AC}C^{-1}_{BD} + C^{-1}_{AD}C^{-1}_{BC}\right]$$

$$\begin{aligned}
\frac{d\psi}{dC} &= \frac{\mu}{2}\left[\frac{d(tr(C))}{d\underline{C}} - \underline{0} - 2.\frac{1}{J}.\frac{dJ}{dC}\right] + \lambda.2\ln(J).\frac{d(\ln(J))}{dC.} \\
&= \frac{\mu}{2}\left[\underline{I} - \frac{2}{J}.\frac{dJ}{dC}\right] + \lambda\, 2\ln(J).\frac{1}{J}.\frac{dJ}{dC} \\
&= \frac{\mu}{2}\underline{I} - \left[\frac{\mu}{2}.\frac{2}{J} - \lambda.2.\ln(J).\frac{1}{J}\right]\frac{dJ}{dC} \\
&= \frac{\mu}{2}\underline{I} - \left[\mu - 2\lambda.\ln(J)\right]\frac{1}{J}.\frac{1}{2}.J.C^{-1} \\
&= \frac{\mu}{2}\underline{I} - \frac{1}{2}\left[\mu - 2\lambda\ln(J)\right]\underline{C}^{-1}
\end{aligned}$$

$$\tau = FSF^T = \mathcal{F}(S) = F\left(\mu I - \left[\mu - 2\lambda\ln(J)\right]C^{-1}\right)F^T$$

$$= \mu\underline{b} - \left[\mu - 2\lambda\ln(J)\right]I$$

$$\begin{aligned}
\frac{d^2\psi}{d\underline{C}\otimes d\underline{C}} &= -\frac{1}{2}\left[\underline{C}^{-1}\otimes\frac{d}{d\underline{C}}\left[\mu - 2\lambda\ln(J)\right] + \left[\mu - 2\lambda\ln(J)\right]\frac{dC^{-1}}{dC}\right] \\
&= -\frac{1}{2}\left[\underline{C}^{-1}\otimes\left[-2\lambda\frac{1}{J}.\frac{dJ}{dC}\right] + \left[\mu - 2\lambda\ln(J)\right]\frac{dC^{-1}}{dC}\right] \\
&= -\frac{1}{2}\left[C^{-1}\otimes\left[-2\lambda\frac{1}{J}.\frac{1}{2}JC^{-1}\right] + \left[\mu - 2\lambda\ln(J)\right].\frac{dC^{-1}}{dC}\right] \\
&= +\frac{\lambda}{2}.\underline{C}^{-1}\otimes\underline{C}^{-1} + \frac{1}{2}\left[\mu - 2\lambda\ln(J)\right]\left(-\frac{dC^{-1}}{dC}\right)
\end{aligned}$$

$$\mathcal{I}\left[\underline{C}^{-1}\otimes\underline{C}^{-1}\right) = \underline{I}\otimes\underline{I}$$

$$\mathcal{I}\left(-\frac{dC^{-1}}{d\underline{C}}\right) = \mathbb{S}$$

$$\mathbb{J}\mathbb{C} = \mathcal{I}\left(4\frac{d^2\psi}{d\underline{C}\otimes d\underline{C}}\right) = 4\left[\frac{\lambda}{2}\underline{I}\otimes\underline{I} + \frac{1}{2}\left[\mu - 2\lambda\ln(J)\right]\mathbb{S}\right]$$

$$= 2\lambda\,\underline{I}\otimes\underline{I} + 2\left[\mu - 2\lambda\ln(J)\right]\mathbb{S}$$

"achon" $\Rightarrow \mathbb{J}\mathbb{C} : (\bullet) = 2\left[\mu - 2\lambda\ln(J)\right](\bullet) + 2\lambda\, tr(\bullet)\,\underline{I}$