3.70] solution problem 3.70.

a] We remind that is $\underline{V} = |\underline{V}|\, \underline{e}_i$

Then $\lambda(\underline{V}) = \dfrac{|\underline{v}|}{|\underline{V}|} = \sqrt{C_{ii}}$

Stretch for $\underline{e}_1 \rightsquigarrow 3$

" " $\underline{e}_2 \rightsquigarrow 2$

Stretch for $\underline{e}_3 \rightsquigarrow 0.6$

b] Stretch in the direction $\underline{e}_1 + \underline{e}_2$. $\rightsquigarrow$ we defined $|\underline{V}| = \dfrac{1}{\sqrt{2}}\ \underline{e}_1 + \underline{e}_2$

$$\underline{v} \cdot \underline{v} = \underline{V} \cdot \underline{\underline{C}} \cdot \underline{V} = \frac{1}{2} \cdot \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} \begin{bmatrix} 9 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 0.36 \end{bmatrix} \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

$$= \frac{13}{2}$$

$$\Rightarrow \boxed{\lambda(\underline{V}) = \sqrt{\frac{13}{2}}}$$

c] $\sin\theta = \dfrac{d\underline{x}^{(1)} \cdot d\underline{x}^{(2)}}{|d\underline{x}^{(1)}| \cdot |d\underline{x}^{(2)}|} = \dfrac{dS_1\ \underline{e}_1 \cdot \underline{\underline{C}} \cdot \underline{e}_2\ dS_2}{dS_1\, dS_2} = 0$

$\rightarrow$ no angle variation.