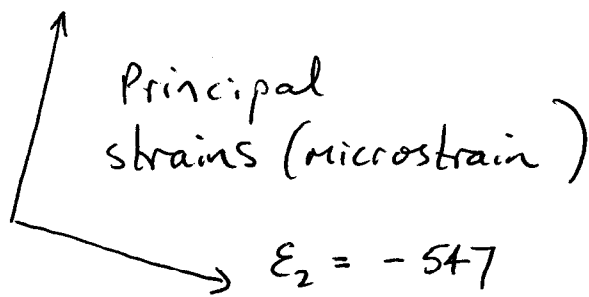
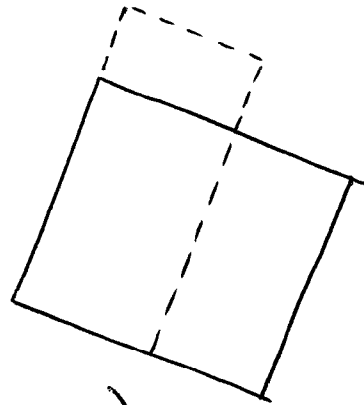


$$\begin{aligned}
 \text{and } \epsilon_{75.3^\circ} &= \frac{1}{2}(-500 + 140) + \frac{1}{2}(-500 - 140) \cos 150.6 \\
 &\quad + \frac{1}{2} \cdot 360 \sin 150.6 \\
 &= -180 + 272.8 + 88.4 \\
 &= \underline{187 \text{ microstrain}} \quad (\epsilon_1)
 \end{aligned}$$

$$\epsilon_1 = 187$$



Deformation.



The deformed element (in the principal orientation) remains rectangular.

ii) To find  $\epsilon_{50^\circ}$

$$\begin{aligned}
 \epsilon_{50^\circ} &= \frac{1}{2}(-500 + 140) + \frac{1}{2}(-500 - 140) \cos 100^\circ \\
 &\quad + \frac{1}{2} \cdot 360 \sin 100^\circ \\
 &= -180 + 55.6 + 177.2 = \underline{53 \text{ microstrain}}
 \end{aligned}$$

Also:

$$\begin{aligned}
 \epsilon_{140^\circ} &= \frac{1}{2}(-500 + 140) + \frac{1}{2}(-500 - 140) \cos 280^\circ \\
 &\quad + \frac{1}{2} \cdot 360 \sin 280^\circ
 \end{aligned}$$