

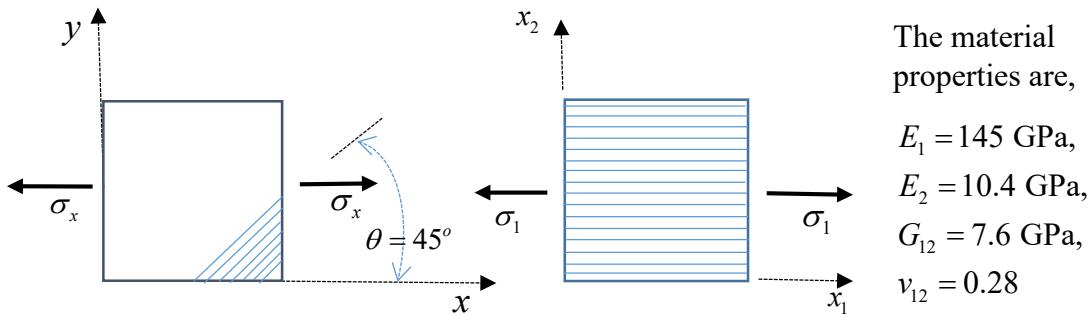
Exercise 1: Show that when,

$$E_1 = E_2 \text{ and } G_{12} = \frac{E_1}{2(1 + \nu_{12})},$$

the material is isotropic.

Hint: Use the first relation in (D.36) and show that the modulus is independent of orientation.

Exercise 2: Two specimens of an orthotropic material (unidirectional laminate) are subjected to uniaxial traction, as shown in the Figure below, with $\sigma_x = \sigma_1 = \sigma$. Calculate the resulting lateral strain.



Exercise 3: A uniaxial lamina is loaded in pure shear $\sigma_{xy} = \tau$ at 45° with the principal material system axes as shown below. Express the resulting strain components in terms of the orthotropic elastic constants $E_1, E_2, G_{12}, \nu_{12}$ (or ν_{21}).

