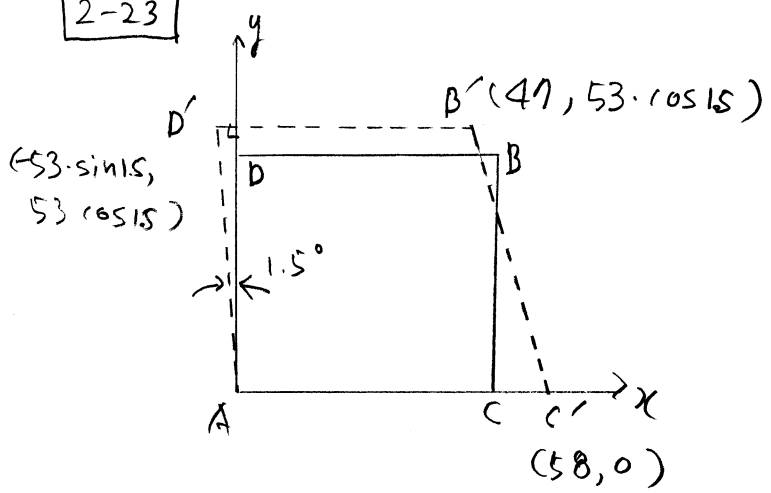
12-331 Solid Mechanics

HW #3 Due: 9/19/2000

2-23



$\overline{AB} = \overline{CD} = \sqrt{50^2 + 50^2} = 70.71$

$\overline{AB'} = \sqrt{47^2 + (53\cdot\cos 1.5)^2} = 70.82$

$\overline{C'D} = \sqrt{(58 + 53\cdot\sin 1.5)^2 + (53\cdot\cos 1.5)^2}$

$= 79.59$

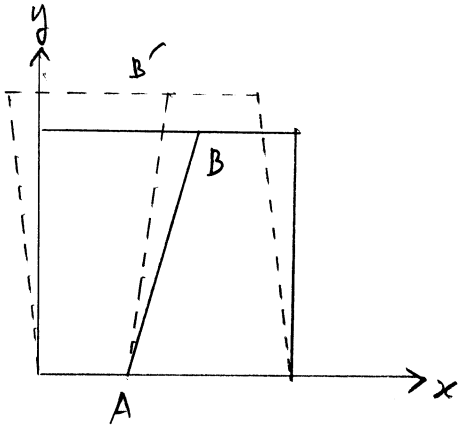
$\varepsilon_{AB'} \equiv \dfrac{\overline{AB'} - \overline{AB}}{AB} = \dfrac{70.82 - 70.71}{70.71}$

$= 1.556 \times 10^{-3}$

$\varepsilon_{C'D} \equiv \dfrac{\overline{C'D} - \overline{CD}}{\overline{CD}} = \dfrac{79.59 - 70.71}{70.71}$

$= 125.6 \times 10^{-3}$

2-25



Location of A, B and B'

$A \equiv (30, 0)$

$B \equiv (70, 100)$

$B' \equiv (55, \sqrt{110^2 - 15^2}) = (55, 108.97)$

$\overline{AB} = \sqrt{(70-30)^2 + 100^2}$

$= 107.70$

$\overline{AB'} = \sqrt{(55-30)^2 + 108.97^2}$

$= 111.80$

$\varepsilon_{AB'} \equiv \dfrac{\overline{AB'} - \overline{AB}}{\overline{AB}} = \dfrac{111.80 - 107.70}{107.70}$

$= 38.06 \times 10^{-3}$