Step 2 (7) Exercise 2022-11-24

see Ma 2004 page 55

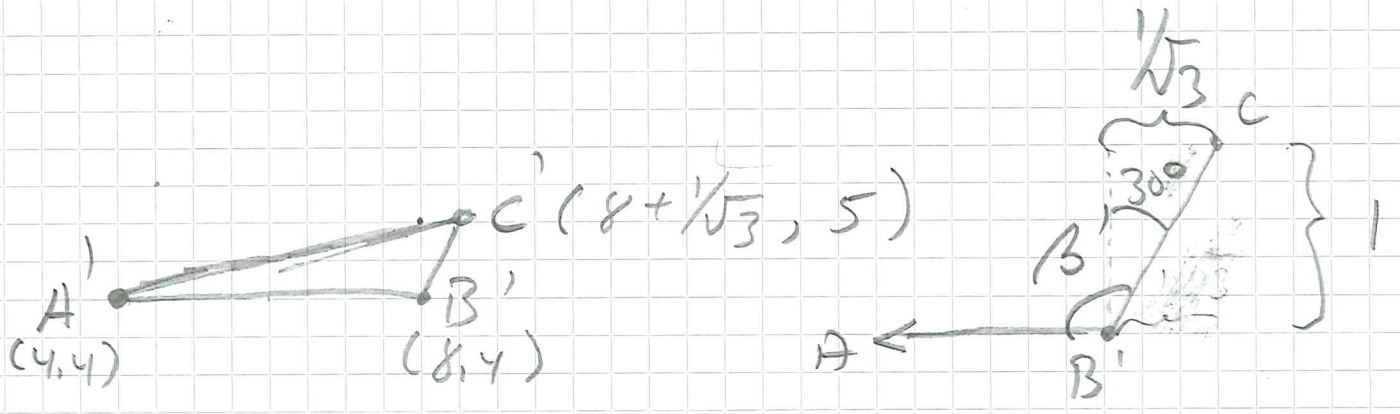
$$A' = \frac{1}{10}\begin{bmatrix} 2 & 1/\sqrt{3} & 4 \\ 0 & 1 & 4 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} 0 \\ 0 \\ 10 \end{bmatrix} = \frac{1}{10}\begin{bmatrix} 40 \\ 40 \\ 10 \end{bmatrix} = \begin{bmatrix} 4 \\ 4 \\ 1 \end{bmatrix}$$

$$B' = \frac{1}{10}\begin{bmatrix} 2 & 1/\sqrt{3} & 4 \\ 1 & 4 & 4 \\ & & 1 \end{bmatrix}\cdot\begin{bmatrix} 20 \\ 0 \\ 10 \end{bmatrix} = \frac{1}{10}\begin{bmatrix} 80 \\ 40 \\ 10 \end{bmatrix} = \begin{bmatrix} 8 \\ 4 \\ 1 \end{bmatrix}$$

$$C' = \frac{1}{10}\begin{bmatrix} 2 & 1/\sqrt{3} & 4 \\ 1 & 4 & 4 \\ & & 1 \end{bmatrix}\begin{bmatrix} 20 \\ 10 \\ 10 \end{bmatrix} = \frac{1}{10}\begin{bmatrix} 80 + \frac{10}{\sqrt{3}} \\ 50 \\ 10 \end{bmatrix} = \begin{bmatrix} 8 + 1/\sqrt{3} \\ 5 \\ 1 \end{bmatrix}$$

Step 2 (8+9)

$z = 1$



$\|A'B'\| = 4$

$C' - B' = [1/\sqrt{3}, 1]$ $\quad \|C'B'\| = \sqrt{1/3 + 1} \approx 1,15$

$C' - A' = [4 + 1/\sqrt{3}, 1]$ $\quad \|C'A'\| = \sqrt{16 + 8/\sqrt{3} + 1/3 + 1} \approx 4,69$

Step 2 (10)

$$\alpha' = \cos^{-1}\frac{\vec{AB}\cdot\vec{AC}}{\|AB\|\cdot\|AC\|} = \cos^{-1}\frac{(4,0)\circ(4+1/\sqrt{3},1)}{4\cdot\sqrt{17+8/\sqrt{3}+1/3}}$$

$$= \cos^{-1}\frac{16+4/\sqrt{3}+1}{4\sqrt{17+8/\sqrt{3}+1/3}} \approx 0,215 \approx 45^{\circ}\% \approx 12,3^{\circ}$$

$$\beta' = \cos^{-1}\frac{\vec{BC}\cdot\vec{BA}}{\|BC\|\cdot\|BA\|} = \cos^{-1}\frac{[1/\sqrt{3},-1]\cdot[-4,0]}{4\cdot\sqrt{1/3+1}} = \cos^{-1}\frac{-4/\sqrt{3}}{-8/\sqrt{3}}$$

$$= \cos^{-1}(1/2) \approx 2,094 \approx 120^{\circ}$$