74 (3.a)

Sketch of the Rotating Vector

The Z axis is fixed so the vector is, in the X and Y:

$$V^a = \frac{1}{\sqrt{2}} \begin{bmatrix} \cos\phi + i\sin\phi \\ \cos\phi - i\sin\phi \end{bmatrix}$$

$\phi = 0$, $V^a = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ 1 \end{bmatrix}$,

$\phi = \pi/2$ $V^a = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ -1 \end{bmatrix}$

$\phi = \pi$ $V^a = \frac{1}{\sqrt{2}} \begin{bmatrix} -1 \\ -1 \end{bmatrix}$

$\phi = 3\pi/2$ $V^a = \frac{1}{\sqrt{2}} \begin{bmatrix} -1 \\ 1 \end{bmatrix}$

a) It rotates clockwise, $\phi = \omega t - kz$.

b) The μ frame is fixed.