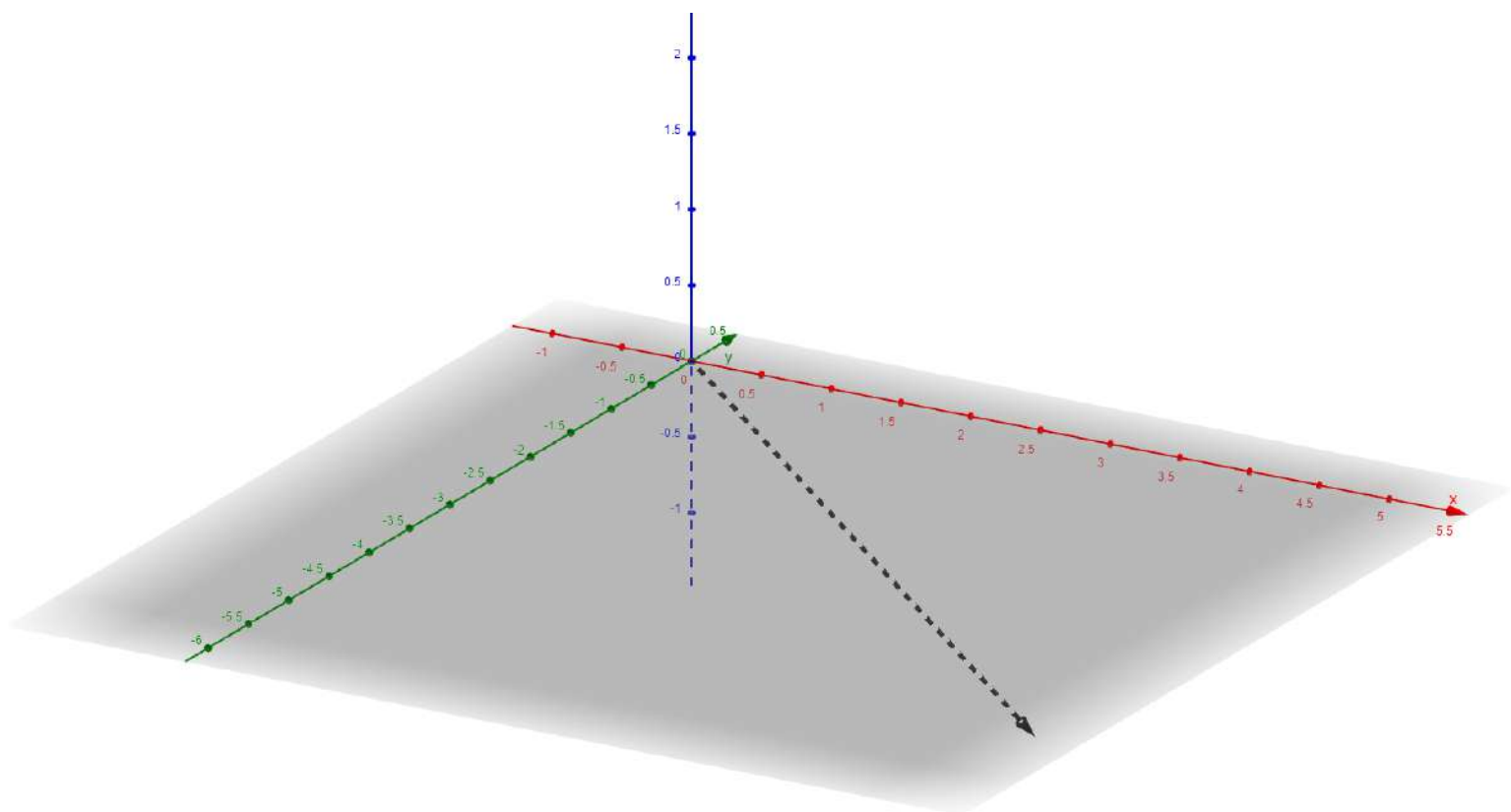
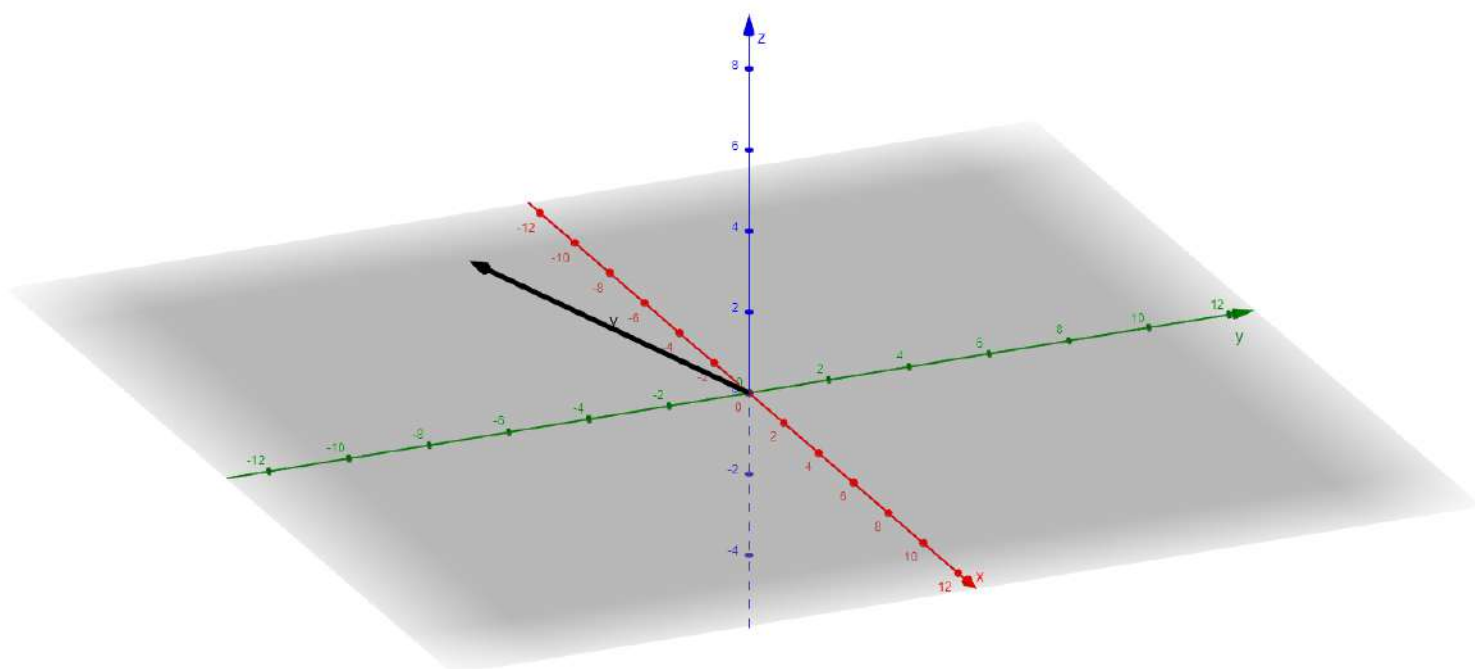


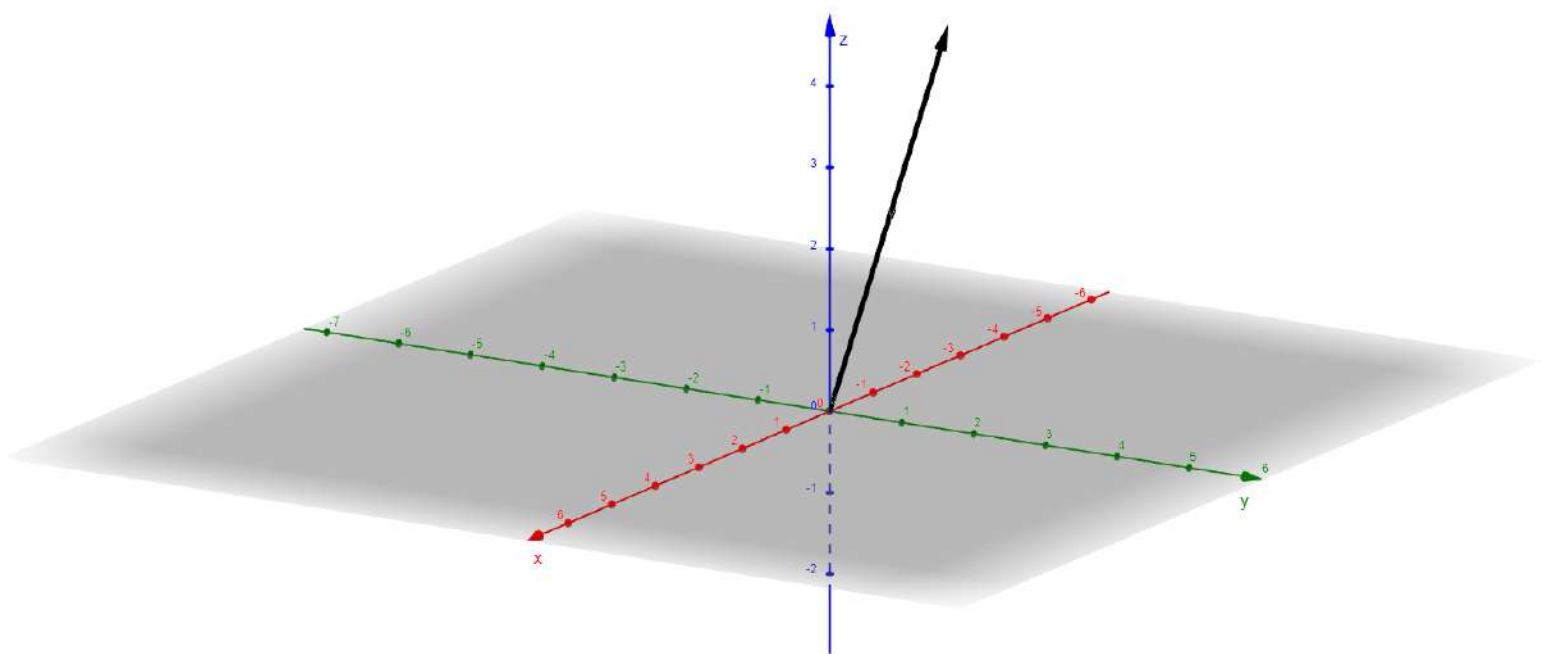
Vector - u



Vector - v



Vector - W



Trabajo Practico 2 Analisis Matematico

Vectores

Vectores creados

$$\vec{U} = (4; -2; 4), \vec{V} = (-10; 5; 15), \vec{W} = (5; 2; -5)$$

2) Modulos

$$|\vec{U}| = \sqrt{4^2 + (-2)^2 + 4^2} = \sqrt{36} = 6$$

$$|\vec{V}| = \sqrt{(-10)^2 + 5^2 + 15^2} = \sqrt{350} = 5\sqrt{14}$$

$$|\vec{W}| = \sqrt{5^2 + 2^2 + (-5)^2} = \sqrt{54} = 3\sqrt{6}$$

3) Angulos directores

$$\vec{U} \quad \cos \alpha = \frac{x}{|\vec{U}|} = \alpha = \cos^{-1}\left(\frac{4}{6}\right) = 48^\circ 11' 23''$$

$$\cos \beta = \frac{y}{|\vec{U}|} = \beta = \cos^{-1}\left(\frac{-2}{6}\right) = 109^\circ 28' 11''$$

$$\cos \gamma = \frac{z}{|\vec{U}|} = \gamma = \cos^{-1}\left(\frac{4}{6}\right) = 48^\circ 11' 23''$$

$$\vec{V} \quad \cos \alpha = \frac{x}{|\vec{V}|} = \alpha = \cos^{-1}\left(\frac{-10}{5\sqrt{14}}\right) = 122^\circ 18' 42''$$

$$\cos \beta = \frac{y}{|\vec{V}|} = \beta = \cos^{-1}\left(\frac{5}{5\sqrt{14}}\right) = 14^\circ 29' 56''$$

$$\cos \gamma = \frac{z}{|\vec{V}|} = \gamma = \cos^{-1}\left(\frac{15}{5\sqrt{14}}\right) = 36^\circ 41' 58''$$

$$\vec{W} \quad \cos \alpha = \frac{x}{|\vec{W}|} = \alpha = \cos^{-1}\left(\frac{5}{3\sqrt{6}}\right) = 47^{\circ} 7' 24''$$

$$\cos \beta = \frac{y}{|\vec{W}|} = \beta = \cos^{-1}\left(\frac{2}{3\sqrt{6}}\right) = 44^{\circ} 12' 25''$$

$$\cos \gamma = \frac{z}{|\vec{W}|} = \gamma = \cos^{-1}\left(\frac{-5}{3\sqrt{6}}\right) = 132^{\circ} 52' 34''$$

4) Amplitud de ángulos

$$\vec{U} = (4; -2; 4) \quad \vec{V} = (-10; 5; 15)$$

$$\vec{U} \cdot \vec{V} = (4; -2; 4) \cdot (-10; 5; 15) = -40 + (-10) + 60 = 10$$

* Forman un ángulo agudo

$$\vec{U} \cdot \vec{V} = |\vec{U}| \cdot |\vec{V}| \cdot \cos \alpha$$

$$10 = 6 \cdot 5\sqrt{14} \cdot \cos \alpha$$

$$\frac{10}{30\sqrt{14}} = \cos \alpha$$

$$\cos^{-1}\left(\frac{\sqrt{14}}{42}\right) = \alpha = 84^{\circ} 53' 21''$$

$$\vec{U} = (4; -2; 4) \quad \vec{W} = (5; 2; -5)$$

$$\vec{U} \cdot \vec{W} = (4; -2; 4) \cdot (5; 2; -5) = 20 + (-4) + -20 = -4$$

* Forman un ángulo obtuso

$$\vec{U} \cdot \vec{W} = |\vec{U}| \cdot |\vec{W}| \cdot \cos \alpha$$

$$-4 = 6 \cdot 3\sqrt{6} \cdot \cos \alpha$$

$$\frac{-4}{18\sqrt{6}} = \cos \alpha$$

$$\cos^{-1}\left(-\frac{2\sqrt{5}}{45}\right) = \alpha = 95^{\circ} 42' 19''$$

5) $\vec{v} \times \vec{w}$

$$\vec{v} = (-10; 5; 15) \quad \vec{w} = (5; 2; -5) \quad \vec{u} = (4; -2; 4)$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -10 & 5 & 15 \\ 5 & 2 & -5 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -10 & 5 & 15 \\ 5 & 2 & -5 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -10 & 5 & 15 \\ 5 & 2 & -5 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -10 & 5 & 15 \\ 5 & 2 & -5 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -10 & 5 & 15 \\ 5 & 2 & -5 \end{vmatrix}$$

$$= (-25\vec{i} + (-20\vec{k}) + 75\vec{j}) - (25\vec{k} + 30\vec{i} + 50\vec{j})$$

$$-25\vec{i} - 20\vec{k} + 75\vec{j} - 25\vec{k} - 30\vec{i} - 50\vec{j}$$

$$\vec{v} \times \vec{w} = -55\vec{i} + 25\vec{j} - 45\vec{k} = (-55; 25; -45)$$

$\vec{u} \times \vec{v}$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 4 & -2 & 4 \\ -10 & 5 & 15 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 4 & -2 & 4 \\ -10 & 5 & 15 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 4 & -2 & 4 \\ -10 & 5 & 15 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 4 & -2 & 4 \\ -10 & 5 & 15 \end{vmatrix}$$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 4 & -2 & 4 \\ -10 & 5 & 15 \end{vmatrix}$$

$$= (-30\vec{i} + 20\vec{k} + (-40\vec{j})) - (20\vec{k} + 20\vec{i} + 60\vec{j})$$

$$-30\vec{i} - 20\vec{j} - 40\vec{j} - 60\vec{j} + 20\vec{k} - 20\vec{k}$$

$$\vec{u} \times \vec{v} = -50\vec{i} - 100\vec{j} + 0\vec{k} = (-50; -100; 0)$$