$$\begin{aligned} x_1' &= \sin\theta a_{11} x_1 + a_{12} x_2 \\ x_2' &= a_{21} x_1 + a_{22} x_2 \end{aligned} \tag{1}$$

$$\begin{aligned} a_{12} &= \cos(x_1', x_2) = \sin(\varphi), \\ a_{21} &= \cos(x_2', x_1) = \cos\left(\varphi + \frac{\pi}{2}\right) = -\sin(\varphi) \end{aligned} \tag{2}$$

$$x_i' = \sum_{j=1}^{2} a_{ij} x_j, \qquad i = 1, 2 \tag{3}$$

$$V_i' = \sum_{j=1}^{N} a_{ij} V_j, \qquad i = 1, 2, ..., N \tag{4}$$

$$a_{ij} = \frac{\partial x_i'}{\partial x_j} \tag{5}$$

$$\begin{aligned} x &\to x_1 \\ y &\to x_2 \end{aligned}$$

$$\begin{aligned} a_{11} &= \cos\varphi \qquad & a_{12} &= \sin\varphi \\ a_{21} &= -\sin\varphi \qquad & a_{22} &= \cos\varphi \end{aligned} \tag{6}$$

$$A_x = A cos\alpha \equiv A \cdot \hat{x}, \qquad A_y = A cos\beta \equiv A \cdot \hat{y}, \qquad A_z = A cos\gamma \equiv A \cdot \hat{z}. \tag{7}$$

$$\mathbf{A} \cdot (\mathbf{B} + \mathbf{C}) = \mathbf{A} \cdot \mathbf{B} + \mathbf{A} \cdot \mathbf{C} \tag{8}$$

$$\mathbf{A} \cdot (y\mathbf{B}) = (y\mathbf{A}) \cdot \mathbf{B} = y\mathbf{A} \cdot \mathbf{B} \tag{9}$$

$$\mathbf{B} = B_x \hat{x} + B_y \hat{y} + B_z \hat{z} \tag{10}$$

$$(\varphi \to -\varphi) \tag{11}$$

$$x_j = \sum_{i=1}^{2} a_{i,j} x_i' \qquad \text{o} \qquad \frac{\partial x_j}{\partial x_i'} = a_{i,j}. \tag{12}$$

$$V_i' = \sum_{j=1}^{N} \frac{\partial x_i'}{\partial x_j} V_j = \sum_{j=1}^{N} \frac{\partial x_j}{\partial x_i'} V_j \tag{13}$$

$$\sum_i a_{i,j} a_{i,k} = \delta_{j,k} \tag{14}$$

$$\sum_i a_{j,i} a_{k,i} = \delta_{j,k} \tag{15}$$

$$\begin{aligned} \delta_{j,k} &= 1 \qquad \text{para} \qquad j = k, \\ \delta_{j,k} &= 0 \qquad \text{para} \qquad j \neq k \end{aligned} \tag{16}$$

$$sin^2\varphi + cos^2\varphi = 1 \tag{17}$$

$$\sum_i \frac{\partial x_j}{\partial x'_i} \frac{\partial x_k}{\partial x'_i} = \sum_i \frac{\partial x_j}{\partial x'_i} \frac{\partial x'_i}{\partial x_k} = \frac{\partial x_j}{\partial x_k}. \tag{18}$$

$$\sum_k A'_k B'_k = \sum_i A_i B_i \tag{19}$$

$$\begin{aligned} \mathbf{C} \cdot \mathbf{C} &= (\mathbf{A} + \mathbf{B}) \cdot (\mathbf{A} + \mathbf{B}) \\ &= \mathbf{A} \cdot \mathbf{A} + \mathbf{B} \cdot \mathbf{B} + 2\mathbf{A} \cdot \mathbf{B} \end{aligned} \tag{20}$$

$$\mathbf{C} \cdot \mathbf{C} = C^2 \tag{21}$$

$$\mathbf{A} \cdot \mathbf{B} = \frac{1}{2}(C^2 - A^2 - B^2) \tag{22}$$

$$C^2 = A^2 + B^2 + 2ABcos\theta \tag{23}$$

$$\begin{aligned} A'_x B'_x + A'_y B'_y + A'_z B'_z = &\sum_i a_{x,i} A_i \sum_j a_{x,j} B_j \sum_i a_{y,i} A_i \sum_j a_{y,j} B_j \\ &\sum_i a_{z,i} A_i \sum_j a_{z,j} B_j \end{aligned} \tag{24}$$

$$\sum_k A'_k B'_k = \sum_l \sum_i \sum_j a_{l,i} A_i a_{l,j} B_j \tag{25}$$

$$\sum_k A'_k B'_k = \sum_i \sum_j \sum_l (a_{l,i}, a_{l,j}) A_i B_j = \sum_i \sum_j \delta_{i,j} A_i B_j = \sum_i A_i B_i \tag{26}$$

$$\mathbf{A} \cdot (\mathbf{B} + \mathbf{C}) = AB_A + AC_A = A(\mathbf{B} + \mathbf{C})_A \tag{27}$$

$$\mathbf{W} = \mathbf{F} \times \mathbf{S} \tag{28}$$

$$\mathbf{A} = 6\hat{x} + 4\hat{y} + 3\hat{z}$$

$$\mathbf{B} = 2\hat{x} - 3\hat{y} - 3\hat{z}$$

$$\mathbf{A} \cdot \mathbf{B} = (12 - 12 - 9) = -9$$

$$\begin{aligned} |\mathbf{A}| &= (36 + 16 + 9)^{\frac{1}{2}} = (61)^{\frac{1}{2}} = 7.81, \\ |\mathbf{B}| &= (4 + 9 + 9)^{\frac{1}{2}} = (22)^{\frac{1}{2}} = 4.69 \end{aligned} \tag{29}$$

$$\mathbf{r} = \hat{x}x + \hat{y}y \tag{30}$$

$$\mathbf{n} \cdot \mathbf{r} = 0 \tag{31}$$

$$\mathbf{e}_m \cdot \mathbf{e}_n = \delta_{m,n} \tag{32}$$

1 Figura 1.6

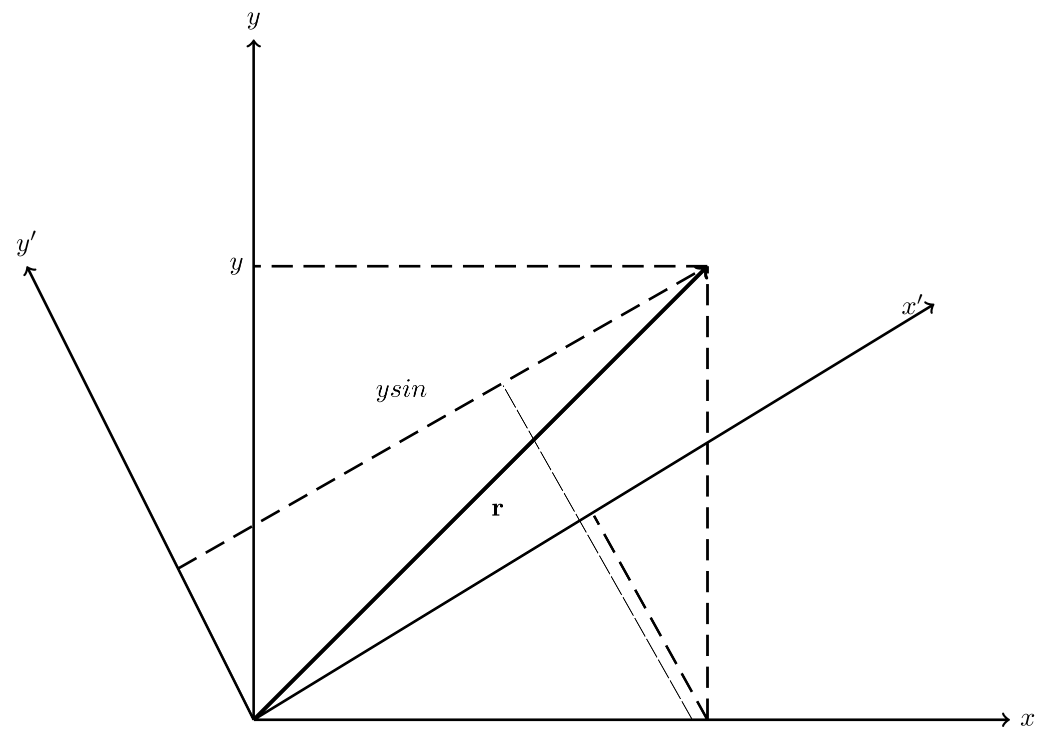

Figure 1: .