

Chapter 6

Vectors

Vectors: \vec{u} , \vec{v} , \vec{w} , \vec{r} , \vec{AB} , ...

Vector length: $|\vec{u}|$, $|\vec{v}|$, ...

Unit vectors: \vec{i} , \vec{j} , \vec{k}

Null vector: $\vec{0}$

Coordinates of vector \vec{u} : X_1, Y_1, Z_1

Coordinates of vector \vec{v} : X_2, Y_2, Z_2

Scalars: λ, μ

Direction cosines: $\cos\alpha, \cos\beta, \cos\gamma$

Angle between two vectors: θ

6.1 Vector Coordinates

550. Unit Vectors

$$\vec{i} = (1, 0, 0),$$

$$\vec{j} = (0, 1, 0),$$

$$\vec{k} = (0, 0, 1),$$

$$|\vec{i}| = |\vec{j}| = |\vec{k}| = 1.$$

$$551. \quad \vec{r} = \vec{AB} = (x_1 - x_0)\vec{i} + (y_1 - y_0)\vec{j} + (z_1 - z_0)\vec{k}$$

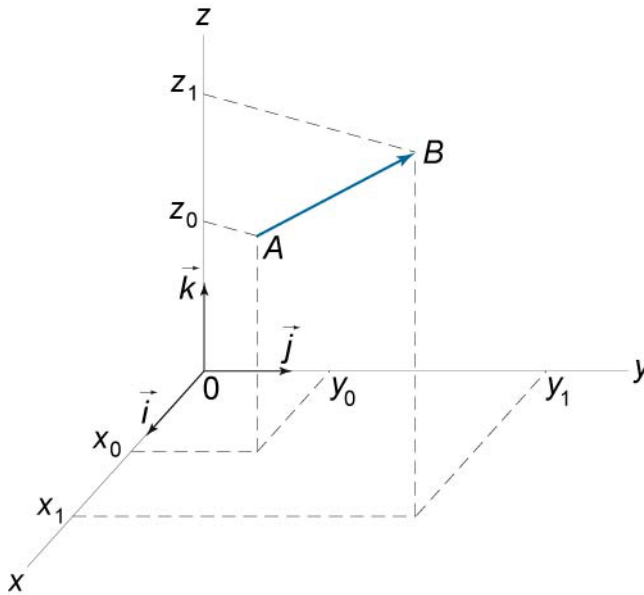


Figure 73.

552. $|\vec{r}| = |\vec{AB}| = \sqrt{(x_1 - x_0)^2 + (y_1 - y_0)^2 + (z_1 - z_0)^2}$

553. If $\vec{AB} = \vec{r}$, then $\vec{BA} = -\vec{r}$.

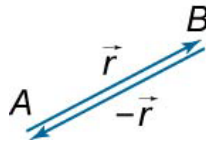


Figure 74.

554. $X = |\vec{r}| \cos \alpha,$
 $Y = |\vec{r}| \cos \beta,$
 $Z = |\vec{r}| \cos \gamma.$

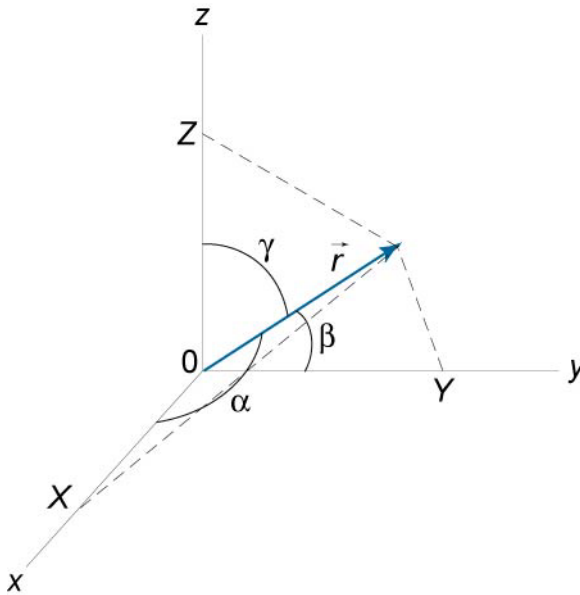


Figure 75.

- 555.** If $\vec{r}(X, Y, Z) = \vec{r}_1(X_1, Y_1, Z_1)$, then
 $X = X_1$, $Y = Y_1$, $Z = Z_1$.