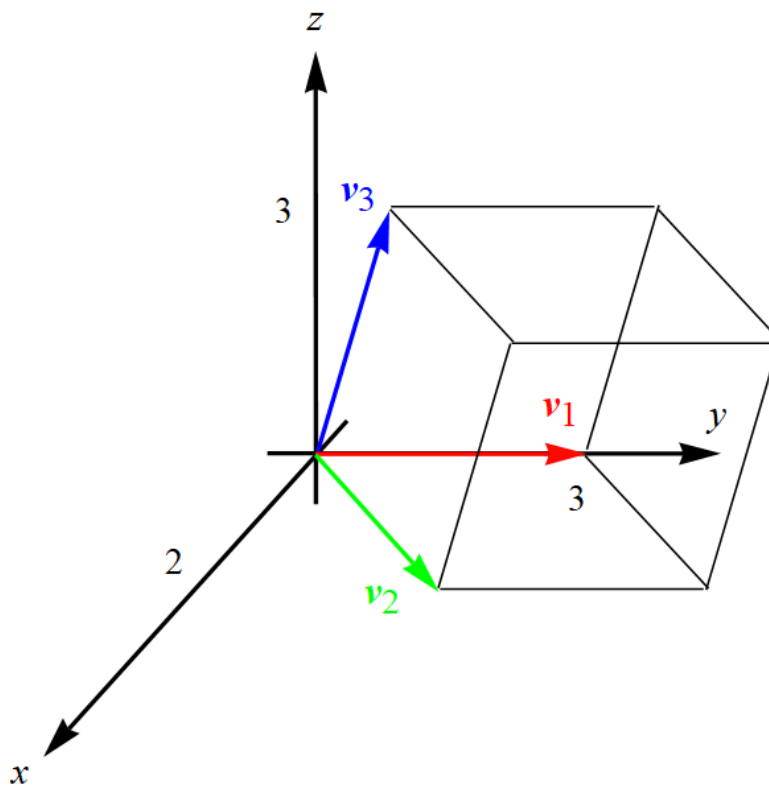


Exercise 14

Let $\mathbf{v}_1 = (0, 3, 0)$, $\mathbf{v}_2 = (2, 2, 0)$, $\mathbf{v}_3 = (1, 1, 3)$. These three vectors with their tails at the origin determine a parallelepiped P .

- Draw P .
- Determine the length of the main diagonal (from the origin to its opposite vertex).

Solution



To obtain the main diagonal vector, add all the vectors together.

$$\begin{aligned}\mathbf{v} &= \mathbf{v}_1 + \mathbf{v}_2 + \mathbf{v}_3 \\ &= (0, 3, 0) + (2, 2, 0) + (1, 1, 3) \\ &= (0 + 2 + 1, 3 + 2 + 1, 0 + 0 + 3) \\ &= (3, 6, 3)\end{aligned}$$

Calculate the magnitude of \mathbf{v} to get its length.

$$\begin{aligned}\|\mathbf{v}\| &= \sqrt{3^2 + 6^2 + 3^2} \\ &= \sqrt{54} \\ &\approx 7.35\end{aligned}$$