Vectors, Algebraic and Geometric

Here we pursue a geometric side of linear systems that will give us visual insights into two and three variable systems.

A **column vector** is a vertical list of numbers:

$$\left[\begin{array}{c} 2 \\ 1 \end{array}\right] \text{ in 2D, } \left[\begin{array}{c} 2 \\ 1 \\ 1 \end{array}\right] \text{ in 3D}$$

These vectors represent points in 2D and 3D using conventional interpretations:

$$\underbrace{\left[\begin{array}{c} 2 \\ 1 \end{array}\right]}_{\text{algebraic view}} \implies \begin{array}{c} \text{move from origin} \\ \text{2 units in } x \\ \text{direction and 1} \\ \text{unit in } y \text{ direction} \end{array} \implies$$