



Definition

The *range* of a matrix $A \in \mathbf{R}^{m \times n}$ is the set

$$\{y \in \mathbf{R}^m \mid (\exists z \in \mathbf{R}^n)(y = Az)\}.$$

We often denote this set by $\{Az \mid z \in \mathbf{R}^n\}$. It is a subset of \mathbf{R}^m , the output space.

The *nullspace* of a matrix $A \in \mathbf{R}^{m \times n}$ is the set

$$\{z \in \mathbf{R}^n \mid Az = 0\}.$$

It is a subset of \mathbf{R}^n , the input space.

