# 1 | Axler5.22 matrix of an operator, $\mathcal{M}(T)$ def

Suppose $T \in \mathcal{L}(V)$ and $v_1, \ldots, v_n$ is a basis of $V$. The *matrix of $T$* wrt this basis is the *n*-by-*n* matrix

$$\mathcal{M}(T) = \begin{pmatrix} A_{1,1} & \cdots & A_{1,n} \\ \vdots & \ddots & \vdots \\ A_{n,1} & \cdots & A_{n,n} \end{pmatrix}$$

whose entries $A_{j,k}$ are defined by

$$Tv_k = A_{1,k}v_1 + \cdots + A_{n,k}v_n$$

## 1.1 | intuition

### 1.1.1 | each row is where the map takes a basis vector