Matrices from Linear Transformations

Of course, this can be generalized to any transformation $T : \mathbb{R}^n \to \mathbb{R}^n$ as

$$M = \begin{array}{c} \begin{matrix} T(\hat{e}_1) & T(\hat{e}_2) & & T(\hat{e}_n) \end{matrix} \\ \begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \end{array}.$$

The numbers a_{ij} are called the **elements** of the Matrix, where i is the **row** of the element, and j is the **column** of the element.

In addition, each column of the matrix tells us how the respective standard basis vector is transformed.