An Example with Polynomials as Vectors

For the polynomials in P_n we often write these in the form

$$v(t) = a_0 + a_1 t + a_2 t^2 + \cdots + a_n t^n$$

that is, as a linear combo of the special basis

$$e_0(t) = 1, e_1(t) = t, e_2(t) = t^2, ..., e_n(t) = t^n$$

We will refer to this basis as the **standard basis in P_n** and write $E = (e_0, e_1, ..., e_n)$. Then we see that for the v above:

$$[v]_E = \left[\begin{array}{c} a_0 \\ \vdots \\ a_n \end{array} \right]$$

Ex: In $V = P_3$ we have

$$v(t) = 2 + 3t + 4t^2 + 5t^3 \implies [v]_E = \left[\begin{array}{c} 2 \\ 3 \\ 4 \\ 5 \end{array} \right]$$