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Base Change

special case where $V = W$ and $T: V \to W$ is the identity

$$id_V : V \longrightarrow V$$
$$v \longmapsto v$$

Definitions 8.49

Suppose $\mathcal{B}_1$ and $\mathcal{B}_2$ are two bases for a vector space V

$P_{\mathcal{B}_1 \to \mathcal{B}_2} = {}_{\mathcal{B}_2}[id]_{\mathcal{B}_1}$ is a <u>base change matrix</u> from $\mathcal{B}_1$ to $\mathcal{B}_2$

Proposition (base change)

Let V be a finite dimension vector space and let $\mathcal{B}_1$ and $\mathcal{B}_2$ be bases of V. If $v \in V$

$$P_{\mathcal{B}_1 \to \mathcal{B}_2} [v]_{\mathcal{B}_1} = [v]_{\mathcal{B}_2}$$