

$$\begin{array}{ccccc}
\{v_j\}_{j=1}^n = \mathfrak{V} \subseteq \mathcal{V} & \xrightarrow{T(\cdot)} & \mathcal{W} & \supseteq \mathfrak{W} = \{w_j\}_{j=1}^m & \\
\Downarrow \Psi & & \Downarrow \Psi & & \\
V[v]_V = v^j v_j = \mathbf{v} & \xrightleftharpoons[T(\cdot)]{T^{-1}(\cdot)} & \mathbf{w} = w^j w_j = W[w]_W = T(\mathbf{v}) = T(V)[v]_V & & \\
\downarrow V^{-1} \uparrow V & \searrow W^{-1} \uparrow W & & & \\
VT^{-1}W^{-1}\mathbf{w} = & & & & = WTV^{-1}\mathbf{v} \\
V^{-1}\mathbf{v} = [v]_V & \xrightleftharpoons[T]{T^{-1}} & [w]_W = W^{-1}\mathbf{w} = [T(\mathbf{v})]_W = T[v]_V & & \\
\Downarrow \cap & & \Downarrow \cap & & \downarrow \\
\mathbb{F}^n & \xrightarrow{T} & \mathbb{F}^m & & T = [T(V)]_W \\
\Downarrow \cap & & \Downarrow \cap & & \\
\{\mathbb{R}^n, \mathbb{C}^m, \dots\} & & \{\mathbb{R}^m, \mathbb{C}^m, \dots\} & &
\end{array}$$