

Coordinates and Change of Basis

Michael Brodskiy

Professor: Lynn Knight

March 24, 2021

- Suppose $\vec{u} = (3, 4)$ and $B = \{(1, 0), (0, 1)\}$. Then you could say $\vec{u} = 3(1, 0) + 4(0, 1)$. This could be written as $[\vec{u}]_B = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$
- Let the set of vectors $\{\vec{v}_1, \vec{v}_2, \dots, \vec{v}_n\}$ be the basis for vector space \mathbf{V} , and c_1, c_2, \dots, c_n be scalars, where $\vec{u} \in \mathbf{V}$ such that $\vec{u} = c_1 \vec{v}_1 + c_2 \vec{v}_2 + \dots + c_n \vec{v}_n$. This can be written as:

$$[\vec{u}]_B = \begin{bmatrix} c_1 \\ c_2 \\ \vdots \\ c_n \end{bmatrix}$$