

Starting From \mathbb{R}^n to \mathbb{C}^n

Special Note: This assignment is due on **Wednesday**.
Prerequisites: Multivariable Calculus and Differential Equations.
Prerequisites: Matrix Algebra, Linear Algebra, and Complex Numbers.
Prerequisites: Complex Numbers, Linear Algebra, and Matrix Algebra.

1.1. \mathbb{R}^n to \mathbb{C}^n

Consider the vector space \mathbb{R}^n of real n -tuples. We will show that \mathbb{R}^n is a real vector space. We will then show that \mathbb{R}^n is a complex vector space. We will then show that \mathbb{R}^n is a real vector space. We will then show that \mathbb{R}^n is a complex vector space. We will then show that \mathbb{R}^n is a real vector space. We will then show that \mathbb{R}^n is a complex vector space.

1.2. \mathbb{C}^n to \mathbb{R}^n

1. **Complex Numbers**
 - (a) Define the addition and multiplication of complex numbers. Show that \mathbb{C} is a field.
 - (b) Show that the complex numbers form a 2-dimensional real vector space.
 - (c) Show that the complex numbers form a 2-dimensional real vector space.
 - (d) Show that the complex numbers form a 2-dimensional real vector space.
2. **Complex Vector Spaces**
 - (a) Define a complex vector space. Show that \mathbb{C}^n is a complex vector space.
 - (b) Show that \mathbb{C}^n is a complex vector space.
 - (c) Show that \mathbb{C}^n is a complex vector space.
 - (d) Show that \mathbb{C}^n is a complex vector space.
3. **Real Vector Spaces**
 - (a) Show that \mathbb{R}^n is a real vector space.
 - (b) Show that \mathbb{R}^n is a real vector space.
 - (c) Show that \mathbb{R}^n is a real vector space.
 - (d) Show that \mathbb{R}^n is a real vector space.