

MATH 54 Homework 6

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Due Wednesday, July 18.

- Let $f(z) = \bar{z}$ for all $z \in \mathbb{C}$. Prove that f is an \mathbb{R} -linear transformation but not a \mathbb{C} -linear transformation.
- Hill 4.1: 7, 10, 11, 35.
- Hill 3.1: 47, 48, 49, 50.
- Hill 3.2: 16, 18, 19, 20, 25, 31
- Hill 4.2: 9.
- Define the following inner product on $C[-1, 1]$:

$$\langle f, g \rangle = \int_{-1}^1 f(x) \overline{g(x)} dx$$

Compute the following inner products.

1. $\langle 1, x \rangle$
 2. $\langle x, \sin x \rangle$
 3. $\langle \sin x, \sin(2x) \rangle$
- Using the standard dot product on \mathbb{C}^3 , compute $\langle \mathbf{u}, \mathbf{v} \rangle$, where $\mathbf{u} = (i, 0, 1)^T$ and $\mathbf{v} = (2, i, 1 + i)^T$.