

Homework 2

Problem 1 (2pts). Let $A \in \mathbb{R}^{m \times n}$, $x \in \mathbb{R}^n$, and $y \in \mathbb{R}^m$. Show that

$$\langle Ax, y \rangle = \langle x, A^T y \rangle$$

Problem 2 (2pts). Let $x \in \mathbb{R}^n$. Show that if

$$\langle x, y \rangle = 0$$

for all $y \in \mathbb{R}^n$, then

$$x = 0.$$

Problem 3 (6pts). Show that the ℓ_1 -norm, ℓ_∞ -norm, and Frobenius norm each satisfy the defining properties of a norm.

Note: We will discuss the different norms on Monday. You can also find their definitions in this week's lecture notes.