

MATH 162A Review: Inner Product

Facts to Know:

Inner product, norm, and distance.

Examples:

1. Prove the Cauchy inequality

$$|\langle u, v \rangle|^2 \leq \|u\|^2 \cdot \|v\|^2.$$

2. Let $\langle \cdot, \cdot \rangle$ be an inner product of \mathbb{R}^n . Then there is a positive definite matrix A such that

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

Here x, y are column vectors of \mathbb{R}^n .