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Assignment 3

IE 7374: Machine Learning

Prove that every norm is a convex function

Answer to Question

Based on the triangle inequality and absolute scalability of the norms, for any $x, y \in R^n$ and any $\theta \in (0, 1)$, we have

$$\|\theta x + (1-\theta)y\| \leq \|\theta x\| + \|(1-\theta)y\| = \theta\|x\| + (1-\theta)\|y\|$$

This suits the form for convex function prove.