



Why

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Definition

Let $A \in \mathbf{R}^{n \times n}$ be symmetric. A is *positive definite* if, for all $x \in \mathbf{R}^d$, $x \neq 0$, $x^\top A x > 0$. A is *positive semidefinite* (or *nonnegative definite*) if, for all $x \in \mathbf{R}^d$, $x^\top A x \geq 0$.

Notation

We denote the set of real-valued positive definite d by d matrices by \mathbf{S}_{++}^d . We denote the set of real-valued positive semidefinite d by d matrices by \mathbf{S}_+^d .

Characterizations

Proposition 1. *Let $A \in \mathbf{S}^d$ and denote the smallest*

¹Future editions will elaborate.

