

Definition

A set $C \subset \mathbf{R}^n$ is a cone (or nonegative homogeneous)

$$x \in C$$
 and $\theta > 0 \Rightarrow \theta x \in C$.

Examples

Let $x \in \mathbf{R}^n$. Define $C_1 \subset \mathbf{R}^n$ by

$$C_1 = \{\theta x \mid \theta \ge \theta\}.$$

 C_1 is a cone. The set

$$C_2 = \{x \in \mathbf{R}^n \mid x_i \ge 0 \text{ for } i = 1, \dots, n\}$$

is a cone. C_2 is called the non-negative orthant. The set

$$C_3 = \{x \in \mathbf{R}^n \mid x_i \le 0 \text{ for } i = 1, \dots, n\}$$

is a cone. The set $C_2 \cup C_3$ is a cone.

Notation

We denote the nonnegative orthant of \mathbb{R}^n by \mathbb{R}^n_+ . We denote the nonpositive orthant of \mathbb{R}^n by \mathbb{R}^n_- .

