



## Definition

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

$$x \in C \text{ and } \theta \geq 0 \Rightarrow \theta x \in C.$$

## Examples

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

$$C_1 = \{\theta x \mid \theta \geq 0\}.$$

$C_1$  is a cone. The set

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

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

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

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

## Notation

We denote the nonnegative orthant of  $\mathbf{R}^n$  by  $\mathbf{R}_+^n$ . We denote the nonpositive orthant of  $\mathbf{R}^n$  by  $\mathbf{R}_-^n$ .



