Remark 6.2. [2DJ] *Given a set $I \subset \mathbb{R}$ there are various ways of saying that a function $f : I \to \mathbb{R}$ is **monotonic**. Let's first list the different types of monotonicity*

$$\forall x, y \in I, x < y \implies f(x) \le f(y) \tag{6.3}$$

$$\forall x, y \in I, x < y \implies f(x) < f(y) \tag{6.4}$$

$$\forall x, y \in I, x < y \implies f(x) \ge f(y) \tag{6.5}$$

$$\forall x, y \in I, x < y \implies f(x) > f(y) \tag{6.6}$$

Unfortunately in common use there are different and incompatible conventions used when naming the previous definitions. Here is a table, in which every convention is a column.

(6.3)	*non-decreasing*	*increasing*	*weakly increasing*
(6.4)	*increasing*	*strictly increasing*	*strictly increasing*
(6.5)	*non-increasing*	*decreasing*	*weakly decreasing*
(6.6)	*decreasing*	*strictly decreasing*	*strictly decreasing*

In this text, the convention in the last column is used.
(The first column is, in my opinion, problematic. It often leads to the use, unfortunately common, of phrases such as *"f is a non-decreasing function"* or *"we take a function f not decreasing"*; this can give rise to confusion: seems to say that f does not meet the requirement to be "decreasing", but it does not specify whether it is monotonic. People who follow the convention in the first column (in my opinion) should always say "monotonic").