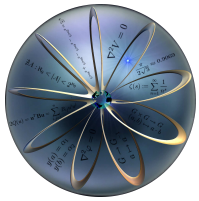

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monotonically nonincreasing

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A sequence (s_n) is *monotonically nonincreasing* if

$$s_m \leq s_n \text{ for all } m > n$$

Similarly, a real function $f(x)$ is monotonically nonincreasing if

$$f(x) \leq f(y) \text{ for all } x > y$$

Compare this to monotonically decreasing.

Conflict note. In some contexts, such as [**?**], this is called *monotonically decreasing* (in turn, our "monotonically decreasing" is called "strictly decreasing"). This is unfortunately counter-intuitive, since a sequence or function that is "flat" (such as $f(x) = 1$) is somehow "decreasing." Beware!

1 Examples

- $(s_n) = 1, 0, -1, -2, \ldots$ is monotonically nonincreasing. It is also monotonically decreasing.
- $(s_n) = 1, 1, 1, 1, \ldots$ is nonincreasing but **not** monotonically decreasing.
- $(s_n) = (\frac{1}{n+1})$ is nonincreasing (note that n is nonnegative).
- $(s_n) = 1, 1, 2, 1, 1, \ldots$ is **not** nonincreasing. It also happens to fail to be monotonically nondecreasing.
- $(s_n) = 1, 2, 3, 4, 5, \ldots$ is **not** nonincreasing, rather it is nondecreasing (and monotonically increasing).

References

[1] "`http://www.nist.gov/dads/HTML/monotoncdecr.html`monotonically decreasing," from the NIST Dictionary of Algorithms and Data Structures, Paul E. Black, ed.