Real Analysis

Math 310 MWF 10:30-11:25am
Fall 1996 127 Fowler

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Monday (09/30/96)

SUMMARY Monotone Sequences

READING §9

Warm-Up
(5-10 minutes) Let's review questions on today's homework

Definitions
Let (s_n) be a sequence of real numbers.

Nondecreasing If $s_n \leq s_{n+1}$ for all n then (s_n) is called a *nondecreasing sequence*

Nonincreasing If $s_n \geq s_{n+1}$ for all n then (s_n) is called a *nonincreasing sequence*

Monotonic A sequence which is nondecreasing or nonincreasing is called a *monotonic sequence* or *monontone sequence*

Examples
Let's do some classifcation of sequences
Write down a sequence and determine whether it is

(a) BOUNDED

(b) NONDECREASING

(c) NONINCREASING

(d) CONVERGENT

(e) DIVERGENT

(f) LIMIT D.N.E.

(g) UNBOUNDED

SOME USEFUL THEOREMS

Theorem 10.2: If (s_n) is a *bounded, nondecreasing* sequence, then s_n converges.

Theorem 10.4: If (s_n) is an *unbounded, nondecreasing* sequence, then $\lim s_n = +\infty$. If (s_n) is an *unbounded, nonincreasing* sequence, then $\lim s_n = -\infty$.

We **like** monotone sequences because if (s_n) is montonic then $\lim s_n$ is always "meaningful", i.e. $\lim s_n$ exists.

Homework Assignment

No Homework due this week: **Exam 1** on Friday Oct 4