Real Analysis

Math 310 — MWF 10:30-11:25am

Fall 1996 — 127 Fowler

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Wednesday (10/09/96)

SUMMARY Cauchy Sequences

READING pages 46-47

Warm-Up
(5-10 minutes) Recall the definition of $\liminf$ and $\limsup$

Definitions
Let (s_n) be a sequence of real numbers.
We say (s_n) is a **Cauchy sequence** if

$$\forall \epsilon > 0 \exists N \ni m > N \text{and} n > N \Rightarrow |s_n - s_m| < \epsilon$$

Write down the definition in your own words:

Groupwork
Form three groups of two and in each group think of a convergent sequence.
Use the formal definition of what a Cauchy sequence is to show that your convergent sequence is Cauchy.

When we say that a sequence is Cauchy we have made quite a strong statement about the sequence. [Think about the **connections** between statements such as "This sequence is Cauchy." "This sequence is convergent." "This sequence is bounded."]

<u>**Theorem**</u>

10.9 All convergent sequences are Cauchy sequences.

<u>**Theorem**</u>

10.10 All Cauchy sequences are bounded.

<u>**Theorem**</u>

10.11 A sequence is convergent *if and only if* it is a Cauchy sequence.

<u>**Homework Assignment (Due Monday October 14)**</u>

§10, page 47-48: **10.1, 10.6 10.10**

§11, page 55: **11.2**