Real Analysis

Math 310 — MWF 10:30-11:25am

Fall 1996 — 127 Fowler

Ron Buckmire ~ 402 Fowler ~ 259-2536 ~ ron@oxy.edu ~ Mon 1:30-3:30pm Wed & Thu 1:30-2:30pm

#29 Monday (12/02/96)

SUMMARY Power Series

READING §23

Examples Consider the following series and determine the interval of convergence for each.

$$\sum_{n=1}^{\infty} x^n$$

$$\sum_{n=1}^{\infty} n!x^n$$

$$\sum_{n=1}^{\infty} \frac{x^n}{n^2}$$

$$\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n}(x-1)^n$$

$$\sum_{n=0}^{\infty} 2^{-n}x^{3n}$$

Continuity

When a power series CONVERGES, it converges to a function $f(x)$. The question is, what are the properties of this function, and how is it related to the properties of each of the partial sums $\sum_{k=0}^{n} a_k x^k = f_n$, which are also functions. (What kind of functions are they?)

Is the limit of a series of continuous functions continuous?

Example

Consider $f_n = (1 - |x|)^n$.

Are the f_n continuous? What is $f(x) = \lim f_n$? Is $f(x)$ continuous?

We call the usual type of convergence we have been talking about when $\lim f_n(x) = f(x)$ **POINTWISE CONVERGENCE**

Write down the definition of this type of convergence.

There is another type of convergence, called **UNIFORM CONVERGENCE**

Write down the definition of UNIFORM CONVERGENCE.

Homework Assignment (Due Monday December 2)

§23, page 132: **23.1, 23.4**