

Module 3 Lesson 3 Notes

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1 Power Series

A power series is an infinite series of the form:

$$\sum_{n=0}^{\infty} a_n x^n = a_0 + a_1 x + a_2 x^2 + a_3 x^3 \dots$$

or

$$\sum_{n=0}^{\infty} a_n (x - c)^n = a_0 + a_1 (x - c) + a_2 (x - c)^2 + a_3 (x - c)^3 \dots$$

it is centered at c

1.1 Geometric Power Series

$$\frac{a_0}{1 - x}$$

Converges if $|x| < 1$

$$g(x) = \sum_{n=0}^{\infty} ax^n = ax^0 + ax^1 + ax^2 + ax^3 \dots$$

Example

$$\sum_{n=1}^{\infty} \frac{x^n}{n \cdot 5^n} \rightarrow \sum_{n=1}^{\infty} \frac{1}{n} \left(\frac{x}{5}\right)^n$$