

Lecture 30: March 18, 2016

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30.1 Power Series Con't

When determining the interval of convergence of a power series :

- First use the ratio test to find the radius of convergence of a power series
- then test endpoints using another test

Theorem (30.1) : For a given power series $\sum c_n(x-a)^n$ there are three possibilities

1. The series converges only for $x = a$ (so radius of convergence is 0)
2. The series converges for all x (so radius of convergence is ∞)
3. There exists a number $R > 0$ such that the series converges for $|x-a| < R$, diverges for $|x-a| > R$ and may or not converge for $x \pm a = \pm R$. So the open interval of convergence is $(a-R, a+R)$.

30.2 Representation of Functions as Power Series

- We could multiply by a constant $\frac{1}{2-2x} = \frac{1}{2} \sum_{n=0}^{\infty} x^n = \sum_{n=0}^{\infty} \frac{x^n}{2}$
- We could Multiply by powers of x $\frac{x^2}{1-x} = x^2 \left(\frac{1}{1-x} \right) = x^2 \sum_{n=0}^{\infty} x^n = \sum_{n=0}^{\infty} x^{n+2}$
- ... To be continued next lecture

End of Lecture Notes
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