11-12

Note Title 11/12/2007

Ex Radius/interval of convergence of $\sum_{n=0}^{\infty} \frac{x^n}{n!}$ $(0! = 1)$

$$= 1 + \frac{x}{1} + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24} + \cdots$$

For any fixed x, we have $\sum a_n$, $a_n = \frac{x^n}{n!}$: Try Ratio Test.

$$\left|\frac{a_{n+1}}{a_n}\right| = \left|\frac{n!}{x^n} \cdot \frac{x^{n+1}}{(n+1)!}\right| = \left|\frac{x^{n+1}}{x^n} \frac{n!}{(n+1)!}\right| = \left|\frac{x}{n+1}\right|$$

$\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| = 0$ for all x. By Ratio Test, series converges ~~for all x~~

$R = \infty$ & $I = (-\infty, \infty)$

Ex $\sum_{n=0}^{\infty} \frac{2^n (x-3)^n}{n+3}$ $\quad a=3, \quad c_n = \frac{2^n}{n+3}$

① Ratio Test to find R.

Technical difficulties!