6.1 Power Series - Review

Power series - infinite series $f(x) = \sum_{n=0}^{\infty} c_n(x-a)^n$

$a$ is called centre.

$\sum_{n=0}^{\infty} (n+1)^n$ is power series centred at $a = -1$

$\sum_{n=0}^{\infty} 2^nx^n$ at $a = 0$

Facts:

1. A power series is convergent if it is defined only if its sequence of partial sums $S_n(x) = \sum_{n=0}^{N} c_n(x-a)^n$ converges.

That is if

$$\lim_{N \to \infty} S_N(x) = \lim_{N \to \infty} \sum_{n=0}^{N} c_n(x-a)^n$$

exists.

If the limit D.N.E. at $x$, then the series is said to be divergent at $x$.

2) Interval of convergence

Every power series has an interval of convergence.

It is the set $[a-r, a+r]$ for which the series converges.

The centre is the interval of convergence in the centre of the series.