MAT3253 Tutorial 6

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1 Power Series Review

Theorem 1. A complex function f defined on an open set U is differentiable at a point $z \in U$ if and only if $\exists$ a function $\phi(h)$, a number a, such that the following equation holds for all h sufficiently small: $f(z+h) - f(z) = ha + h\phi(h)$, where $\phi(h) \to 0$ as $h \to 0$.

Theorem 2. A power series is analytic inside its circle of convergence.

Theorem 3. $\sum a_n$ converges absolutely to A, $\sum b_n$ converges to B. Then the series $\sum c_n$, where $c_n := \sum_0^n a_k b_{n-k}$, converges to AB.

Corollary 3.1. $e^{a+b} = e^a e^b$