

# Complex Analysis

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# 1 Holomorphic Functions

**Definition 1.1.** Let  $f : U \subset \mathbb{C} \rightarrow \mathbb{C}$ . We call  $f$  holomorphic in  $a \in U$  if the following limit exists:

$$\lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}, \quad (h \in \mathbb{C}).$$