Complex analysis (basics)

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Definition 1 (Analytic/holomorphic function)**.** *For a conplex variable z, we say that the complex function $f(z)$ is analytic or holomorphic at z (and in a neighgbourhood around z), iff:*

$$f'(z) = \lim_{z' \to z} \frac{f(z) - fz'}{z - z'}$$

exists and is well defined as $z' \to z$ from any direction in the complex plane
A function analytic on all points in the complex plane is also said to be entire.

Corollary 0.1 (Cauchy–Riemann equations)**.** *For any analytic function, $f(z) = u + iv$, where $z = x + iy$, the following holds:*

$$\partial ux = \partial vy$$
$$\partial uy = -\partial vx$$

Proof. hi □

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