MAT215: Complex Variables And Laplace Transformations

Emon Hossain[1]

[1]Lecturer
MNS department
Brac University

LECTURE-09

Problem

$f(z) = z^2$, find the derivative at $x = 3 + 2i$.

Using the definition,

$$\lim_{\Delta z} \to 0 \frac{f(z + \Delta z) - f(z)}{\Delta z}$$

make your life easy enough.

Problem

$f(z) = \bar{z}$, find the derivative at $x = 3 + 2i$.

Using the definition,

$$\lim_{\Delta z} \to 0 \frac{f(z + \Delta z) - f(z)}{\Delta z}$$

and use $\Delta z = \Delta x + i\Delta z$ when needed.

Problem

Using definition show that $f(z) = \frac{2z-3i}{3z-2i}$ is differentiable at $z = -i$.

Problem

Using definition find the derivative of $f(z) = z^2$ at $z = z_0$ (at all points).

Problem

Using definition show that $f(z) = \bar{z}$ is not differentiable at $z = 0$.

Problem

Using definition show that $f(z) = z\bar{z}$ is not differentiable other than $z = 0$.

Using the definition,

$$\lim_{\Delta z} \to 0 \frac{f(z + \Delta z) - f(z)}{\Delta z}$$

and use $\Delta z = \Delta x + i\Delta z$ when needed.

Can all derivative of $f : \mathbb{R}^2 \to \mathbb{R}^2$ bw represented as derivative of $F : \mathbb{C} \to \mathbb{C}$.