

Panel 1

Complex HW

① Find the Maclaurin series (i.e. the Taylor series centered at $z_0 = 0$) for the following functions:

a) $f(z) = \cosh(z)$

b) $g(z) = \frac{z}{z+z^4}$

c) $h(z) = z^3 e^{2z}$

② Find the Taylor series for $f(z) = \frac{1}{1-z}$ centered at $z_0 = i$. What is the radius of convergence?

③ Find $\lim_{z \rightarrow 0} \frac{z^2 \sin(z) - z^3}{z^5}$ without L'Hospital's Rule

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Panel 2

④ Find the radius of convergence of the Taylor series centered at z_0 for:

a) $f(z) = \frac{1}{z-z}$ for $|z+1| < R$ (i.e. $z_0 = -1$)

b) $f(z) = \frac{z}{(z+1)(z-2)}$ for $|z-(1+i)| < R$
(i.e. $z_0 = 1+i$)

c) $f(z) = \frac{1}{e^z - i}$ for $|z| < R$ (i.e. $z_0 = 0$)

Note: You do not have to actually find the series, you can find R by drawing appropriate pictures

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