Plotting Complex Functions

⊞ pZ

⊟ Examples

pZ("f", B, N, cm) plots the argument of f(z) in the box B with N points with the colormap cm

$cm := pCmapJet(200, 1)$

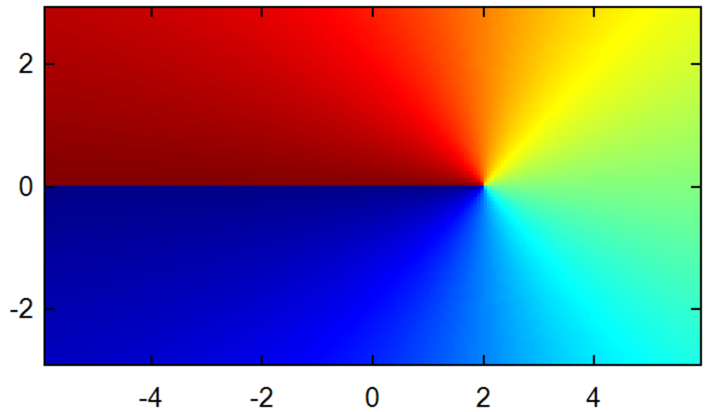
$B := \begin{bmatrix} -6 & 6 \\ -3 & 3 \end{bmatrix} = \begin{bmatrix} x1 & x2 \\ y1 & y2 \end{bmatrix}$

$N := 2 \cdot \begin{bmatrix} 100 \\ 50 \end{bmatrix} = \begin{bmatrix} nx \\ ny \end{bmatrix}$

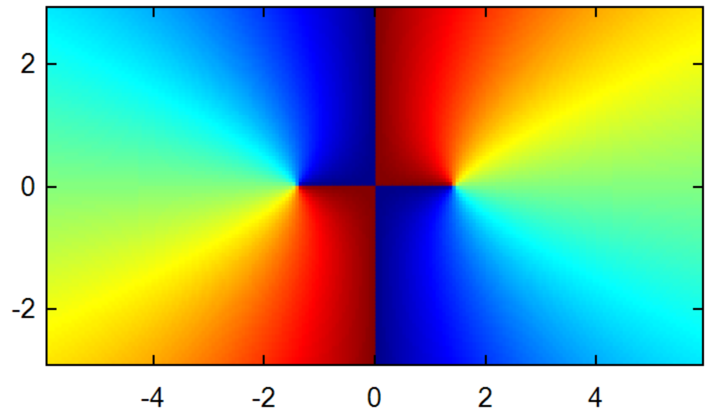
tc

Zeros counterclockwise color change. Also, the polynomial degree cycle the colors.

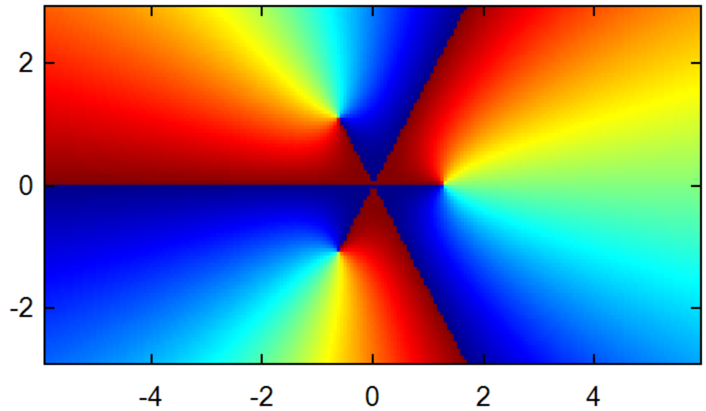
$f_1(z) := z - 2$



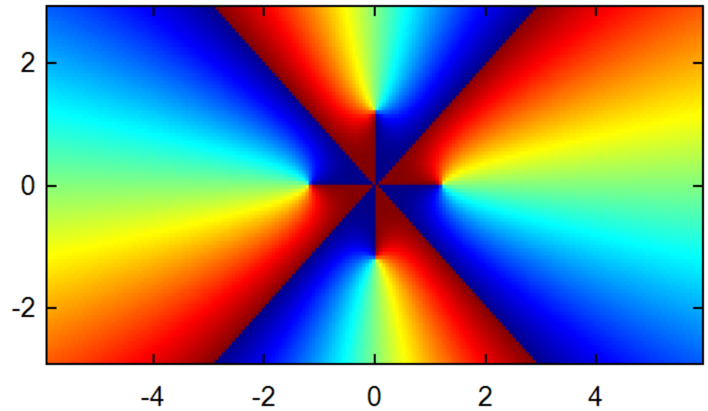
$f_2(z) := z^2 - 2$



$f_1(z) := z^3 - 2$

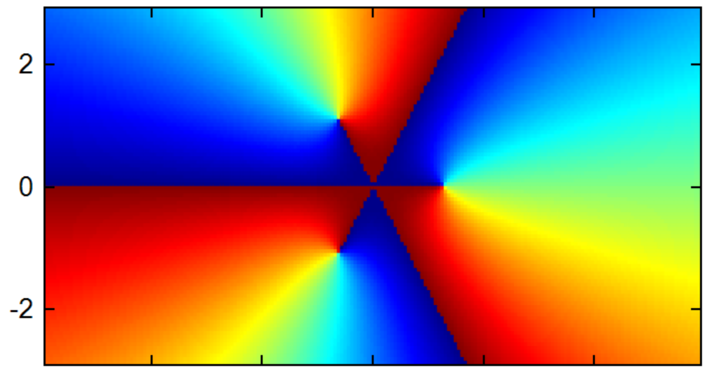


$f_2(z) := z^4 - 2$

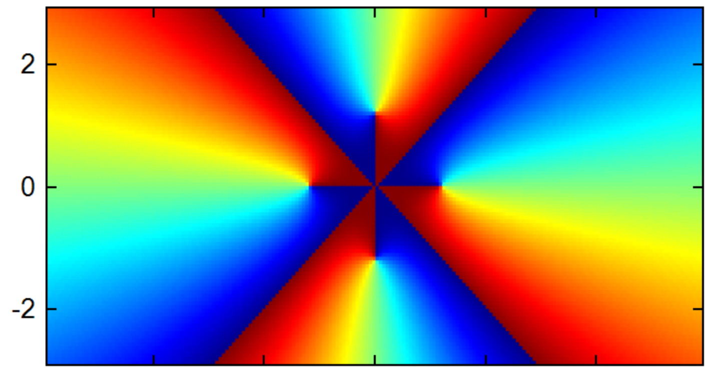


Poles clockwise color change.

$f_1(z) := \frac{1}{z^3 - 2}$

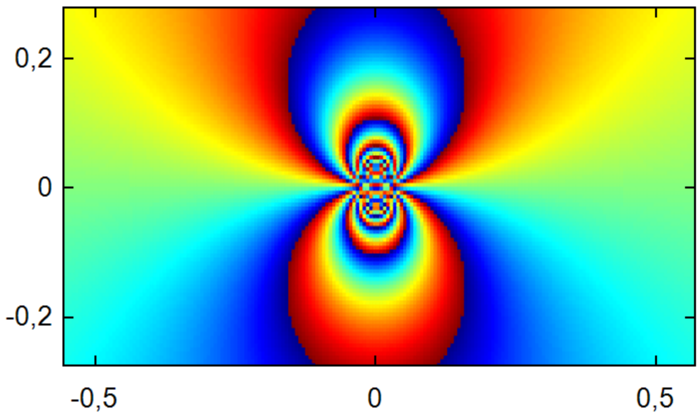


$f_2(z) := \frac{1}{z^4 - 2}$



Essential dicontinuity infinite color change.

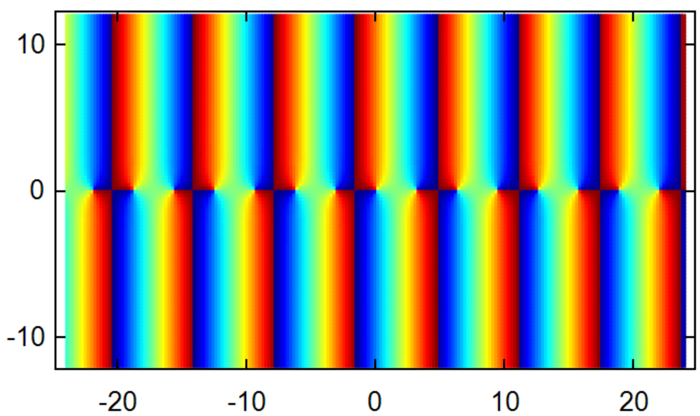
$f_1(z) := e^{-\frac{1}{z}}$



$pZ(\text{"f.1"}, 0.1 \cdot B, N, cm)$

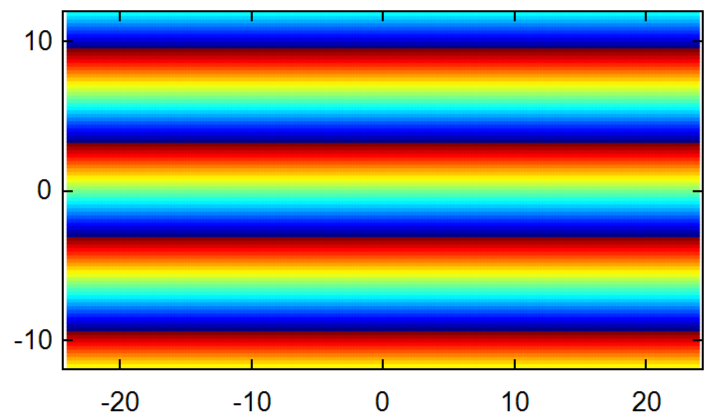
Periodicity

$f_1(z) := \sin(z)$ period 2π (horizontal)



$pZ(\text{"f.1"}, 4 \cdot B, N, cm)$

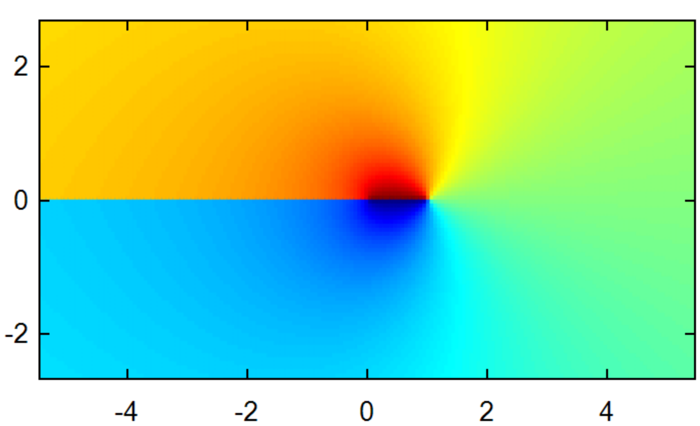
$f_2(z) := e^{z}$ period 2πi (veritcal)



$pZ(\text{"f.2"}, 4 \cdot B, N, cm)$

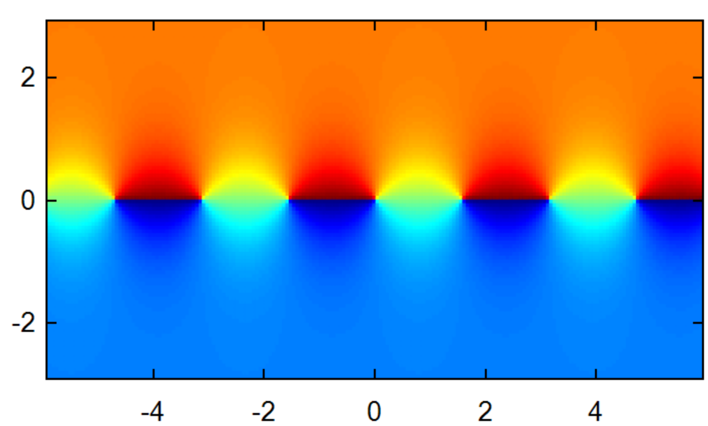
Gallery

$f_1(z) := \ln(z)$



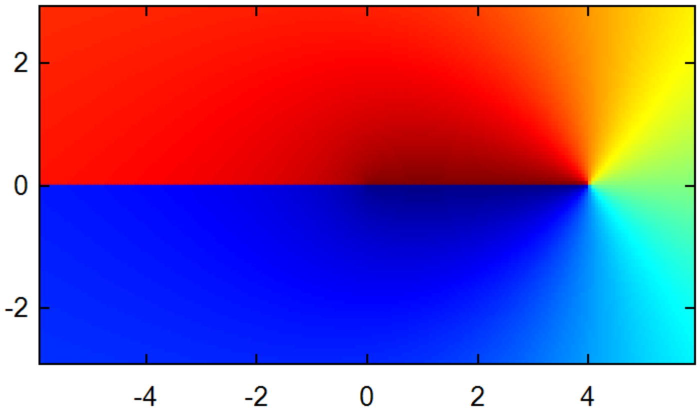
$pZ(\text{"f.1"}, B, N, cm)$

$f_2(z) := \tan(z)$



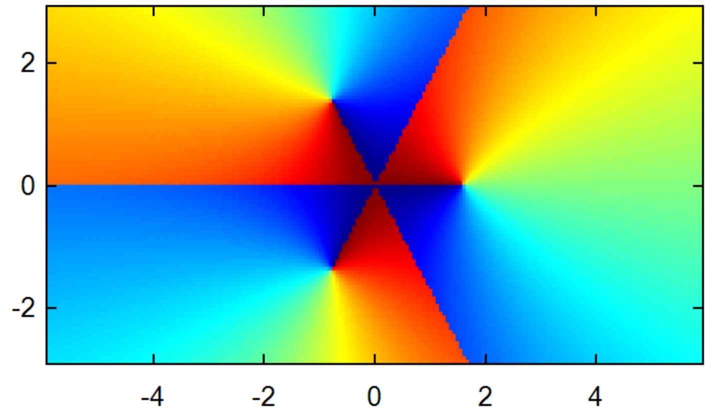
$pZ(\text{"f.2"}, B, N, cm)$

$f_1(z) := \sqrt{z} - 2$



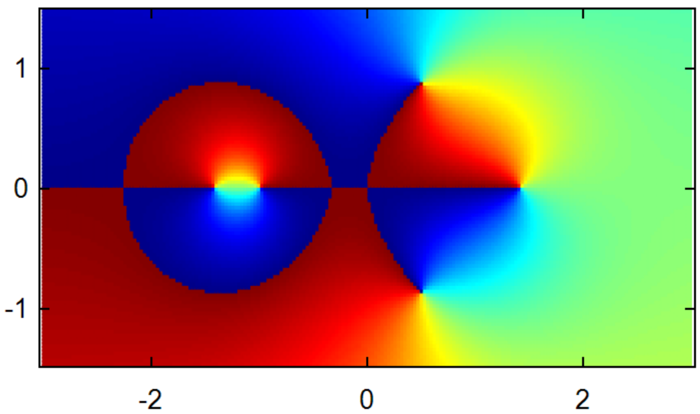
$pZ("f.1", B, N, cm)$

$f_2(z) := \sqrt{z^3} - 2$



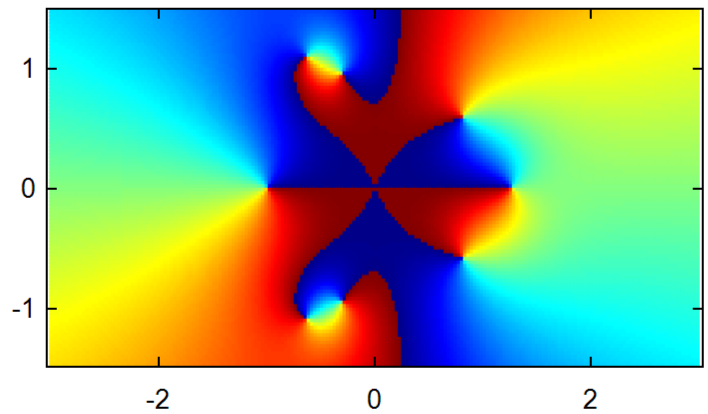
$pZ("f.2", B, N, cm)$

$f_1(z) := \dfrac{z^2 - 2}{z^3 + 1}$



$pZ("f.1", 0.5 \cdot B, N, cm)$

$f_2(z) := \dfrac{z^5 + 1}{z^3 - 2}$



$pZ("f.2", 0.5 \cdot B, N, cm)$

Alvaro