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

$cm := pCmapJet(200, 1)$

$pZ("f", B, N)$ plots the complex map of f(z) in the box B with N points

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

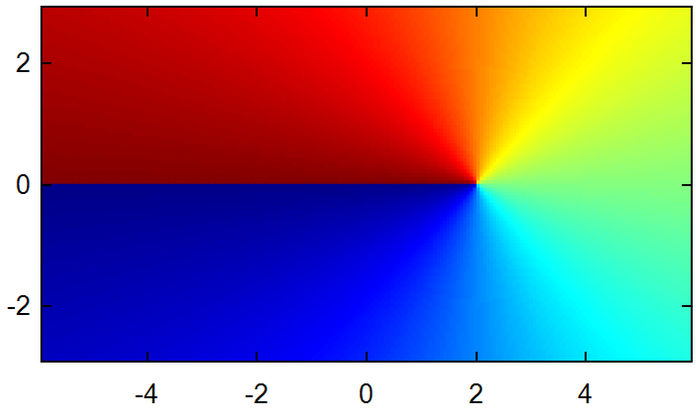
$$N := 2 \cdot \begin{bmatrix} 100 \\ 50 \end{bmatrix} = \begin{bmatrix} nx \\ ny \end{bmatrix}$$

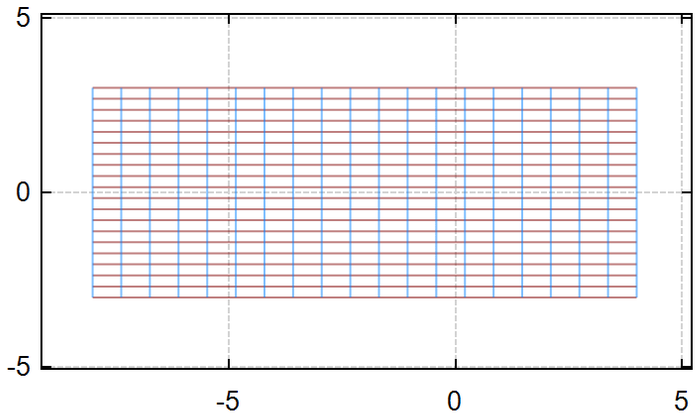
$B' := B$

$$N' := 1 \cdot \begin{bmatrix} 20 \\ 20 \end{bmatrix}$$

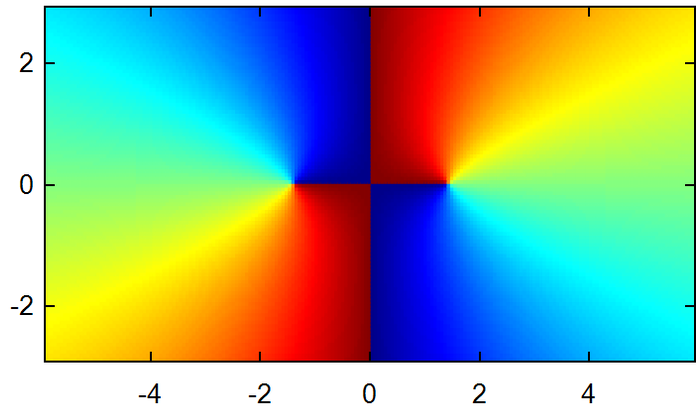
Zeros counterclockwise color change. Also, the polynomial degree cycle the colors.

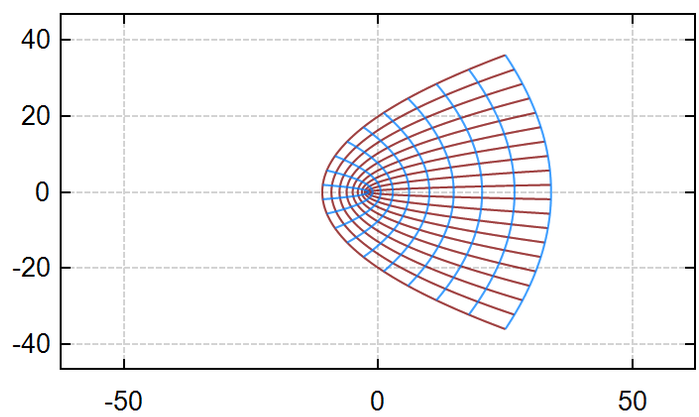
$f_1(z) := z - 2$



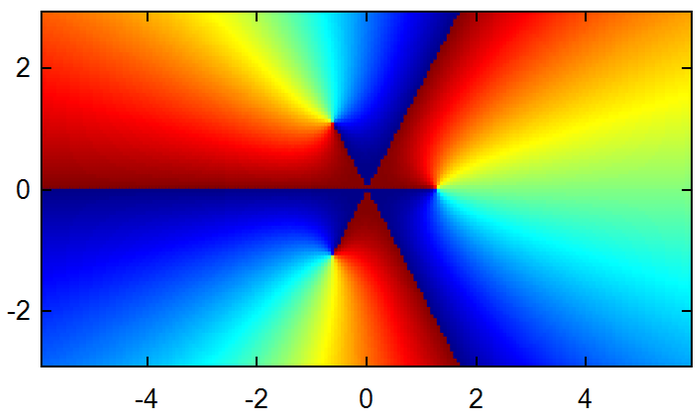


$f_2(z) := z^2 - 2$

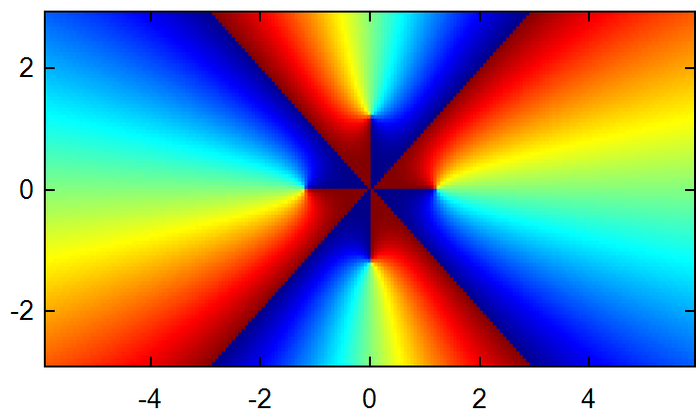


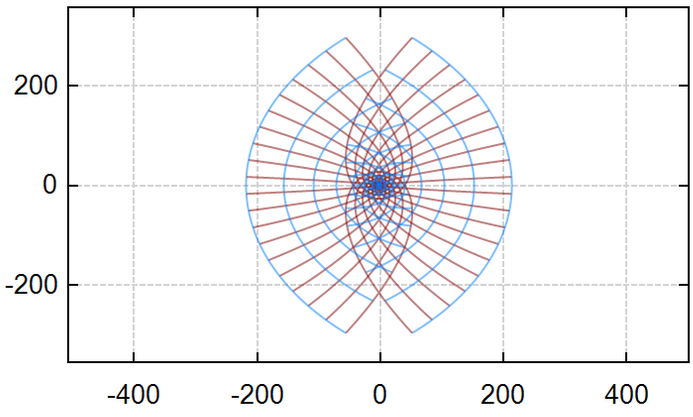


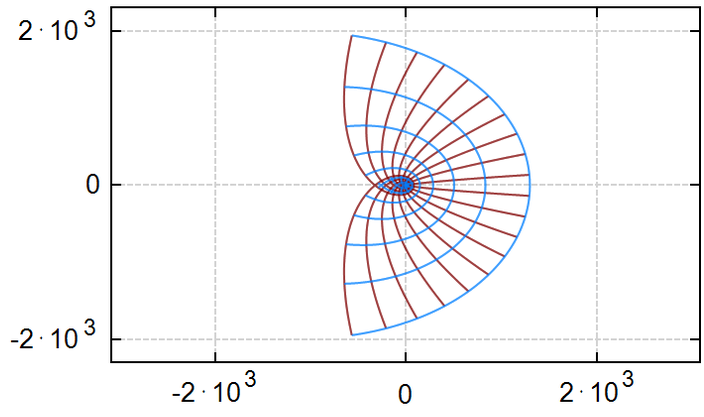
$f_1(z) := z^3 - 2$



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

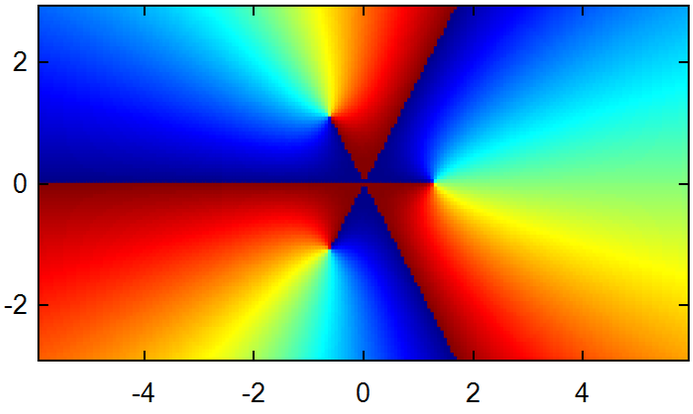


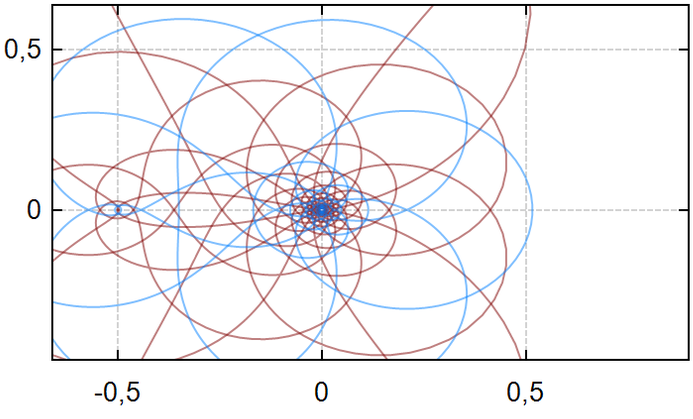




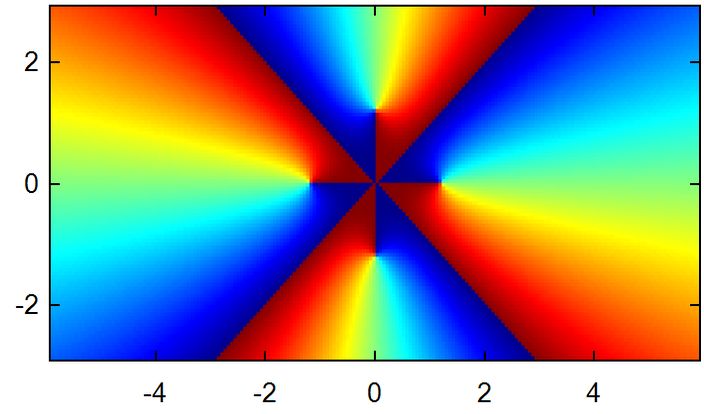
Poles clockwise color change.

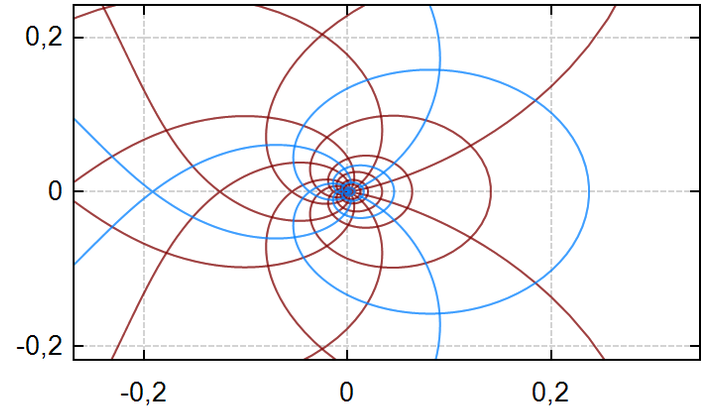
$$f_1(z) := \frac{1}{z^3 - 2}$$





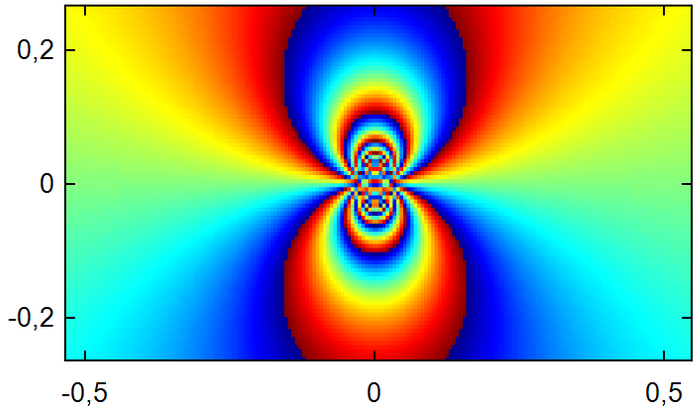
$$f_2(z) := \frac{1}{z^4 - 2}$$

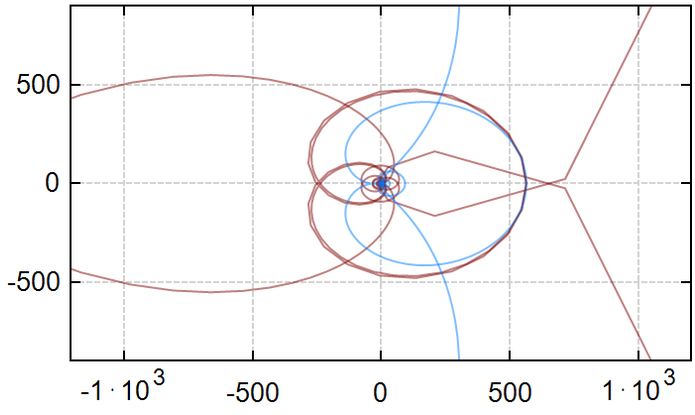




Essential dicontinuity infinite color change.

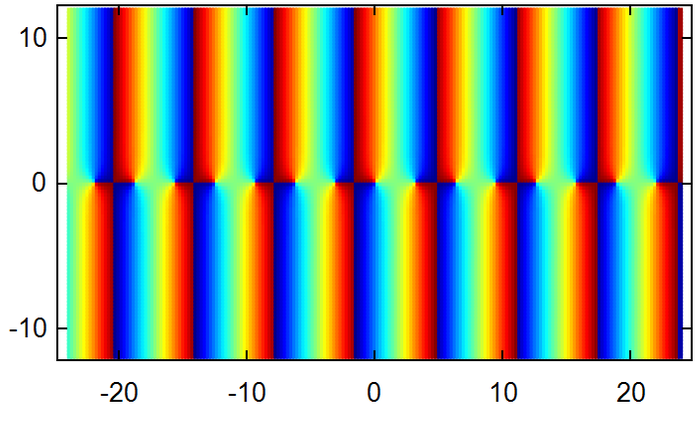
$$f_1(z) := e^{-\frac{1}{z}}$$

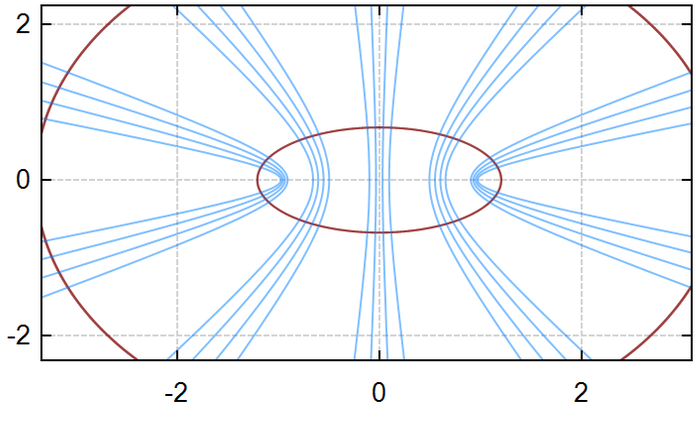




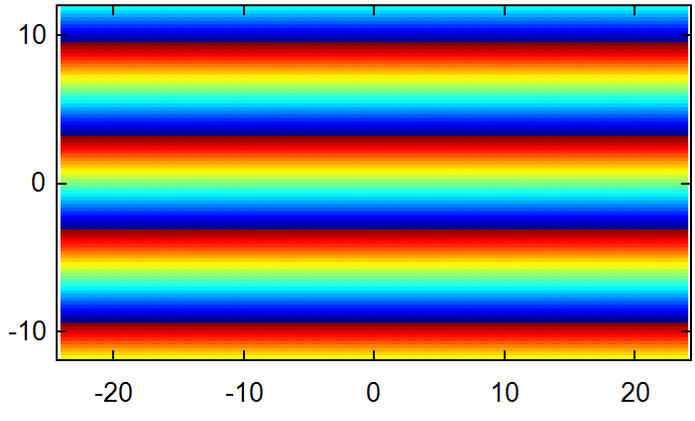
Periodicity

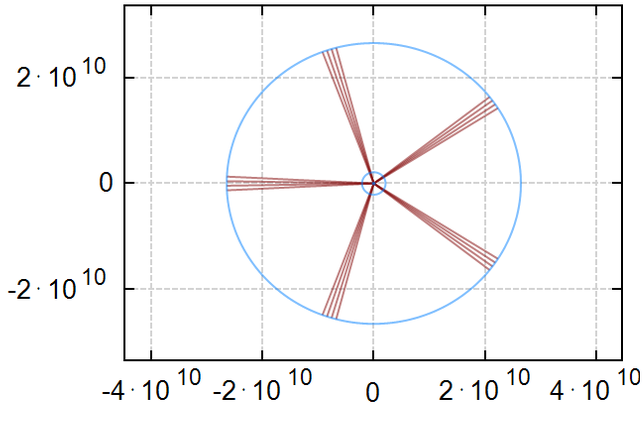
$f_1(z) := \sin(z)$ period 2π (horizontal)





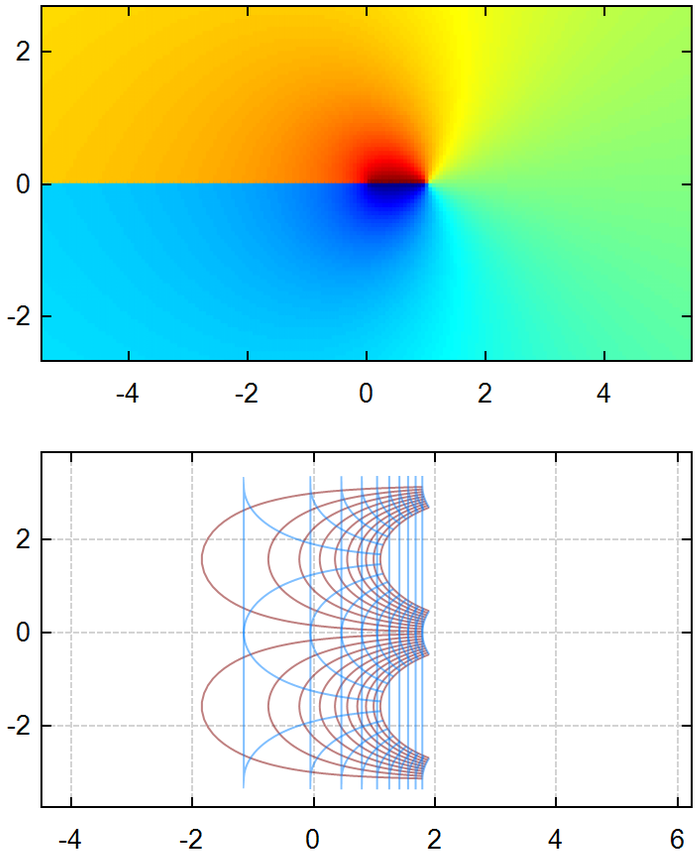
$f_2(z) := e^{z}$ period 2πi (veritcal)



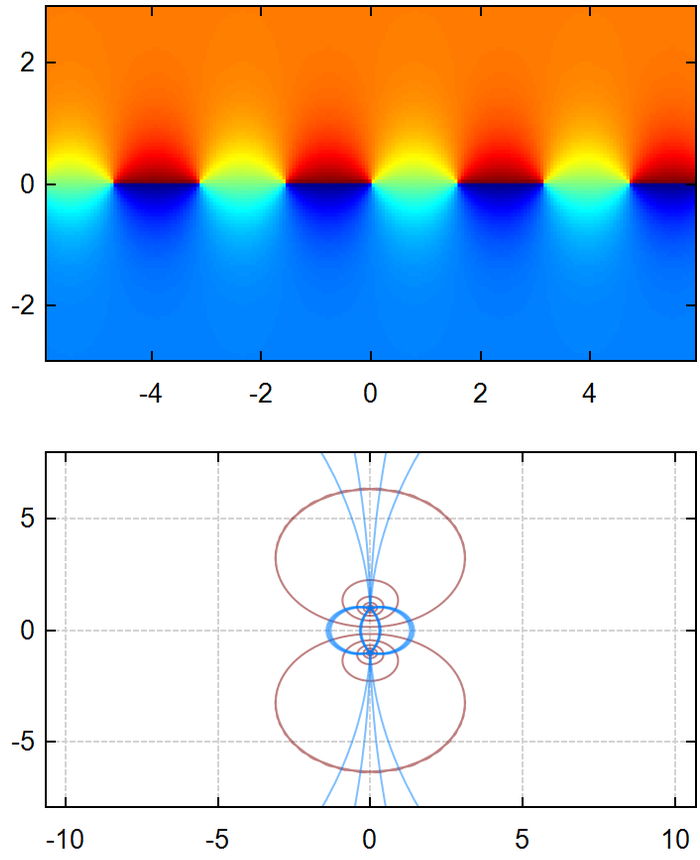


Gallery

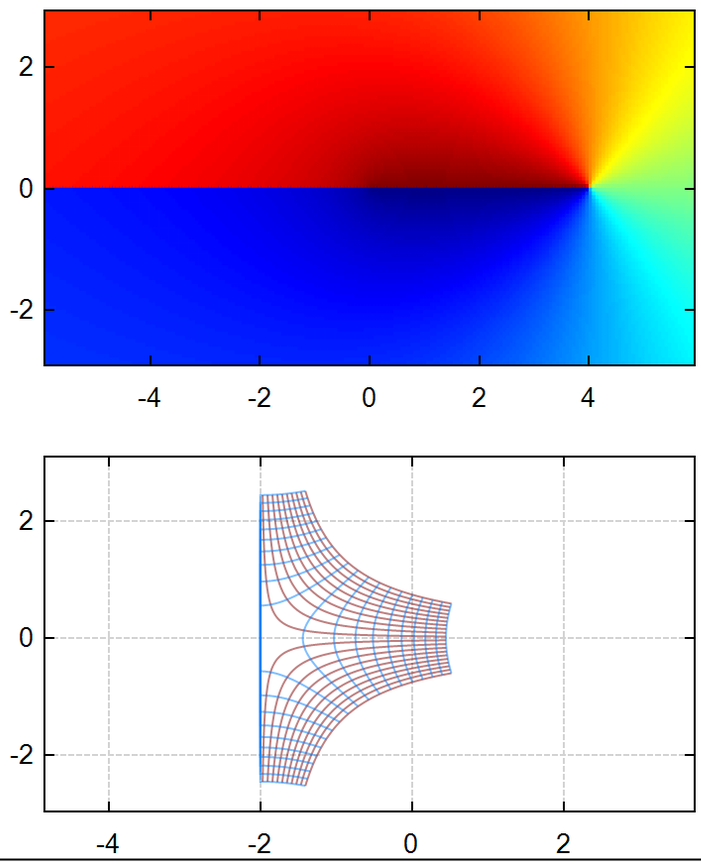
$f_1(z) := \ln(z)$



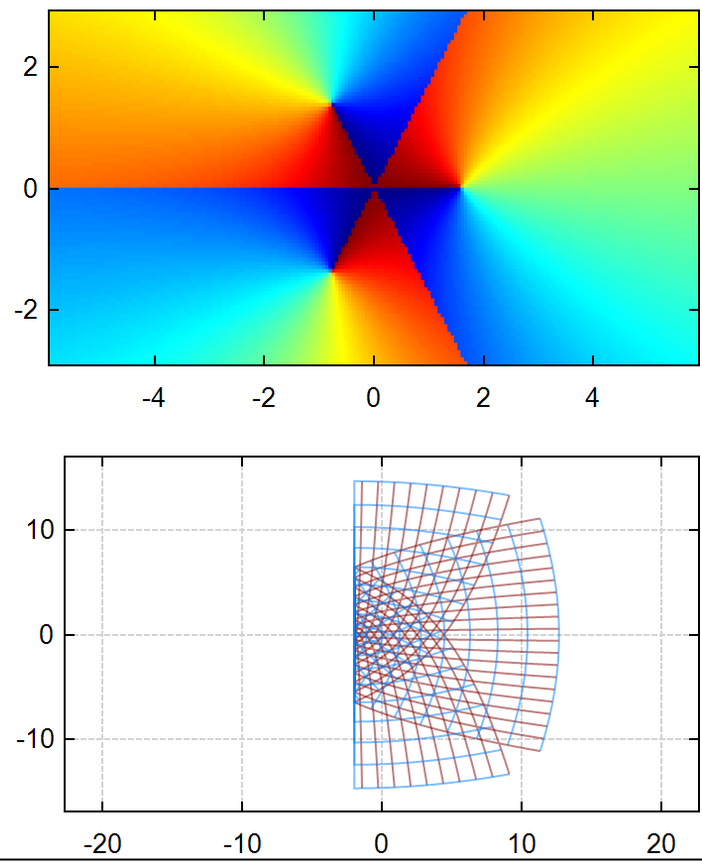
$f_2(z) := \tan(z)$



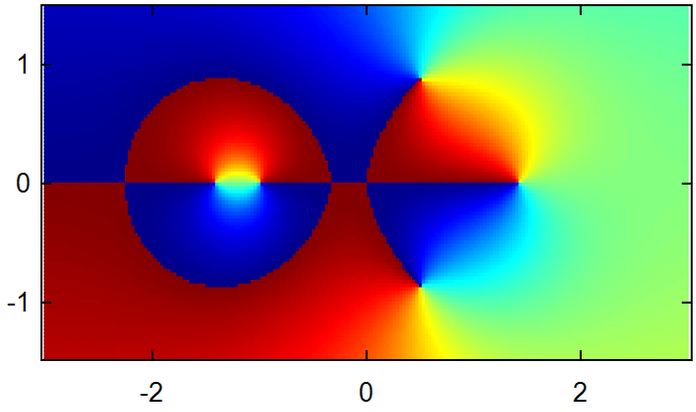
$f_1(z) := \sqrt{z} - 2$

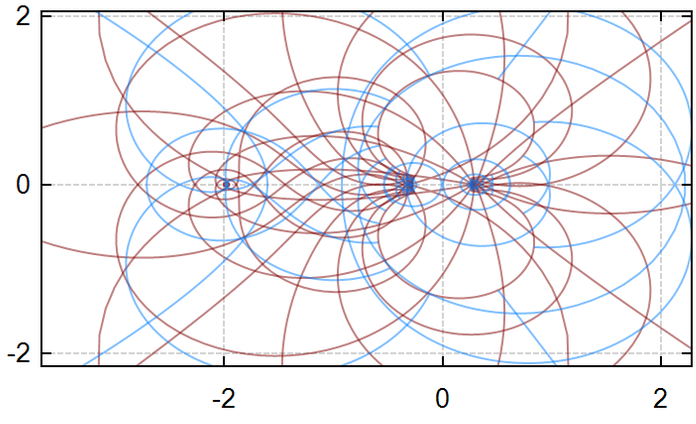


$f_2(z) := \sqrt{z^3} - 2$

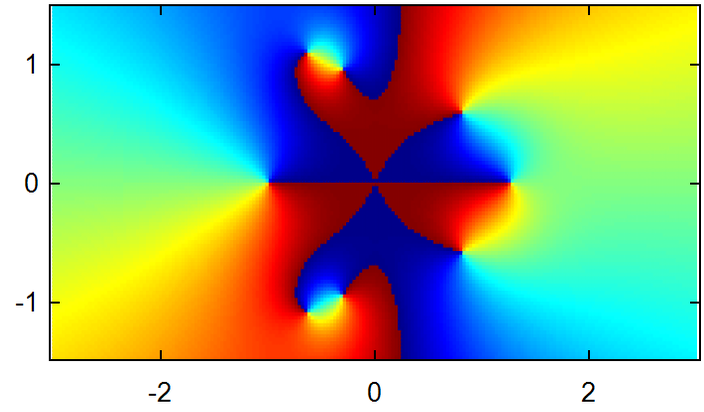


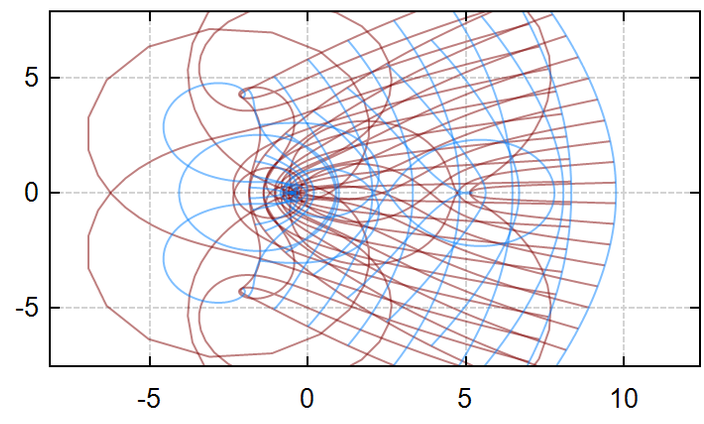
$$f_1(z) := \frac{z^2 - 2}{z^3 + 1}$$





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





Alvaro