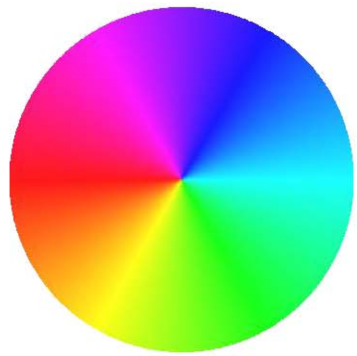
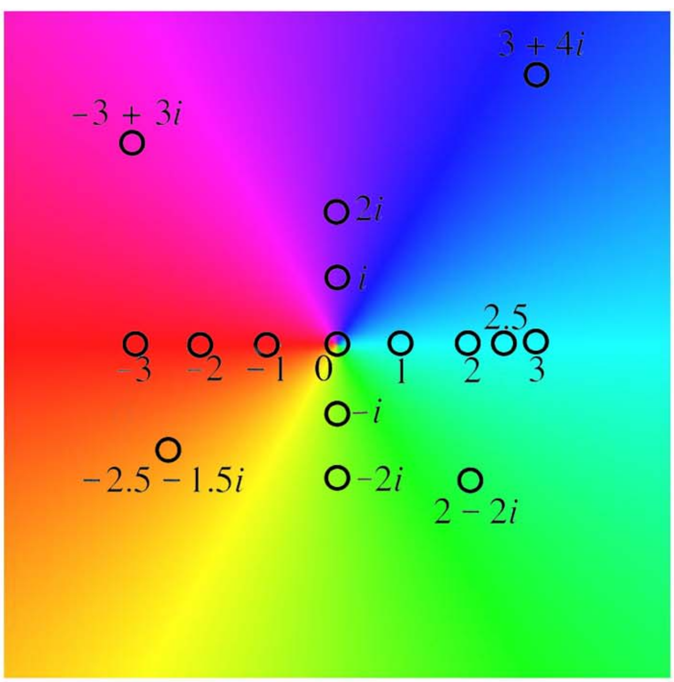
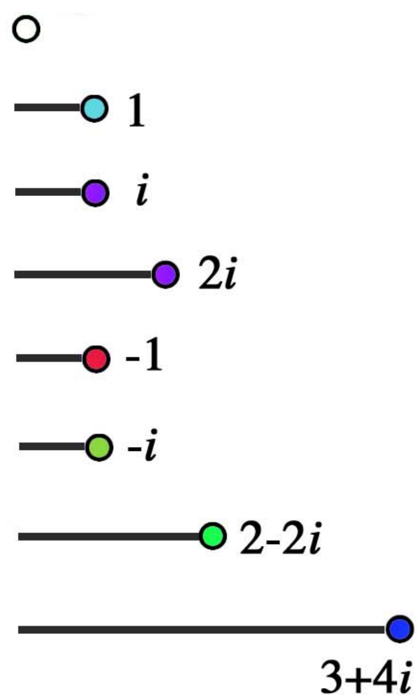
ROUE DES COULEURS





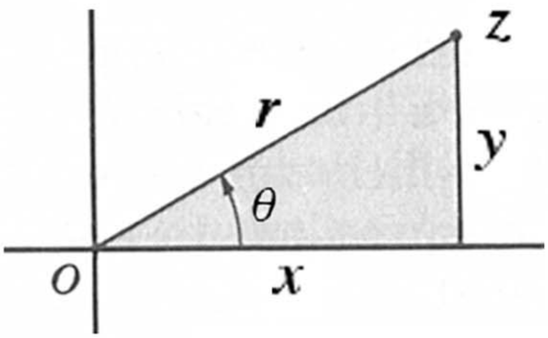


Nombre complexe = baguette magique à bout coloré

Longueur de la baguette : module du nombre complexe

Couleur du bout : argument du nombre complexe selon la roue des couleurs

OPÉRATIONS COMPLEXES



$$z = x + yi$$

forme cartésienne

$$z = r(\cos(\theta) + i\sin(\theta))$$

forme polaire

$x = \mathrm{Re}(z) =$ partie réelle de z

$y = \mathrm{Im}(z) =$ partie imaginaire de z

$r = |z| =$ module de z

$\theta =$ argument de z

$$i^2 = -1$$

$$\begin{aligned}
(a+bi)+(c+di) &= (a+c)+(b+d)i \\
(a+bi)-(c+di) &= (a-c)+(b-d)i \\
(a+bi)(c+di) &= (ac-bd)+(ad+bc)i \\
\frac{a+bi}{c+di} &= \frac{ac+bd}{c^2+d^2} + \frac{bc-ad}{c^2+d^2}i
\end{aligned}$$

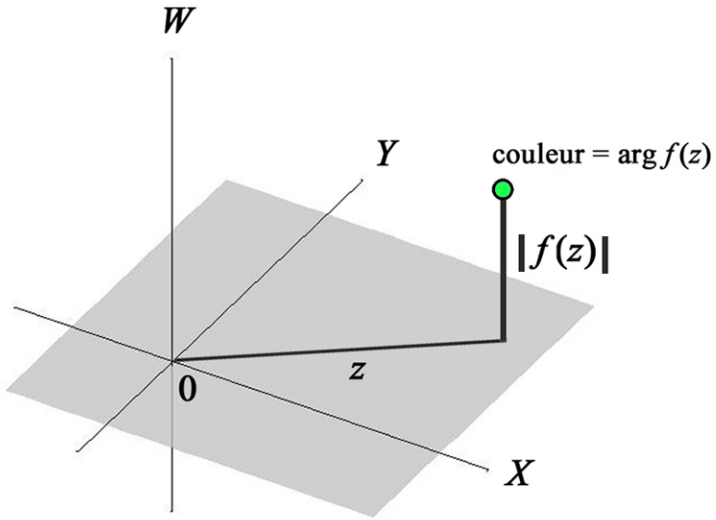
$$z_1 = r_1(\cos\theta_1 + i\sin\theta_1), \quad z_2 = r_2(\cos\theta_2 + i\sin\theta_2)$$

$$\begin{aligned}
z_1 z_2 &= r_1 r_2 \{\cos(\theta_1+\theta_2) + i\sin(\theta_1+\theta_2)\} \\
\frac{z_1}{z_2} &= \frac{r_1}{r_2}\{\cos(\theta_1-\theta_2) + i\sin(\theta_1-\theta_2)\}
\end{aligned}$$

REPRÉSENTATIONS DE w = f(z)

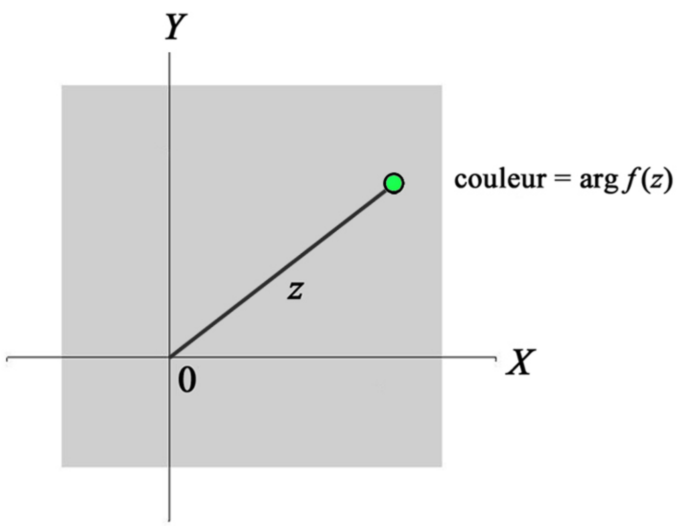
En 3 dimensions :

À chaque z appartenant au domaine de f, on attache perpendiculairement la baguette magique qui représente $w = f(z)$.

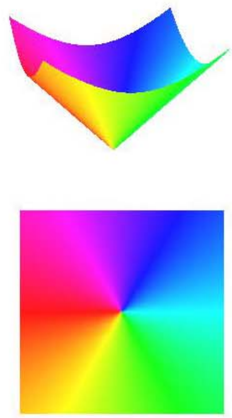


En 2 dimensions : (vue d'en haut)

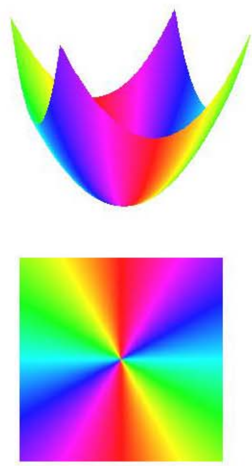
Chaque z appartenant au domaine de f, est colorié par la couleur $\arg f(z)$.



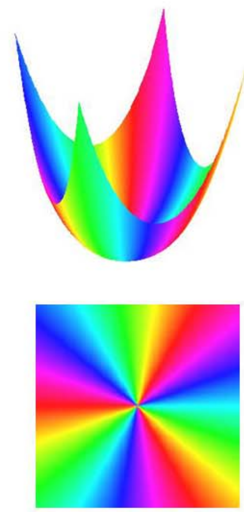
PUISSANCES DE z



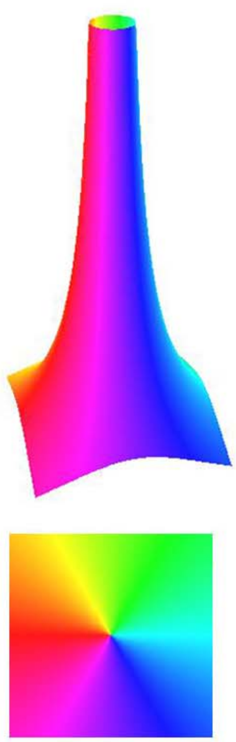
$f(z) = z$



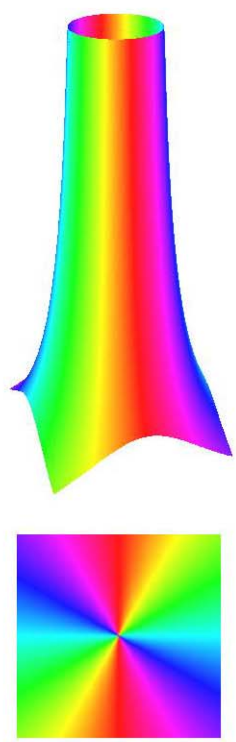
$f(z) = z^2$



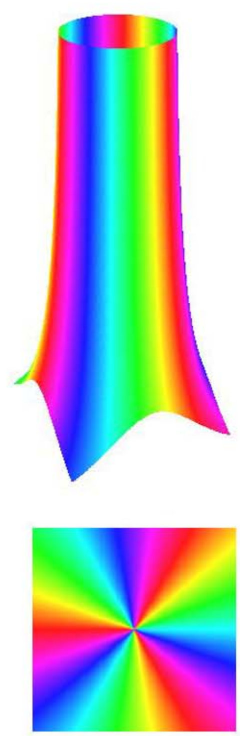
$f(z) = z^3$



$f(z) = 1/z$



$f(z) = 1/z^2$



$f(z) = 1/z^3$