Aide-mémoire

$$e^{iz} = \cos(z) + i\sin(z), \qquad \cos(z) = \frac{e^{iz}+e^{-iz}}{2}, \qquad \sin(z) = \frac{e^{iz}-e^{-iz}}{2i}$$

$$\cosh(z) = \frac{e^{z}+e^{-z}}{2}, \qquad \sinh(z) = \frac{e^{z}-e^{-z}}{2}, \qquad \cosh^2(z) - \sinh^2(z) = 1,$$

$$\cos(iz) = \cosh(z), \qquad \sin(iz) = i\sinh(z),$$

$$\sin(z) = \sin(x)\cosh(y) + i\ \cos(x)\sinh(y), \qquad \cos(z) = \cos(x)\cosh(y) - i\ \sin(x)\sinh(y)$$

$$z = e^{\ln(z)}, \qquad \ln(z) = \ln(r) + i(\theta_0 + 2k\pi), \qquad ln(e^z) = z + 2k\pi i$$

$$\ln(z_1\ z_2) = \ln(z_1) + \ln(z_2) + 2\ k\ \pi\ i, \qquad \ln\left(\frac{z_1}{z_2}\right) = \ln(z_1) - \ln(z_2) + 2\ k\ \pi\ i,$$

$$\text{Arcsin(z)} = -i\ \text{Ln}\left(iz + \sqrt{1-z^2}\right), \qquad \text{Arccos(z)} = -i\ \text{Ln}\left(z + i\sqrt{1-z^2}\right),$$

$$\text{Arctan(z)} = \frac{-i}{2}\text{Ln}\left(\frac{1+iz}{1-iz}\right), \qquad \text{Arccotg(z)} = \frac{-i}{2}\text{Ln}\left(\frac{z+i}{z-i}\right)$$

$$\begin{cases} \dfrac{\partial u}{\partial x} = \dfrac{\partial v}{\partial y} \\ \dfrac{\partial v}{\partial x} = -\dfrac{\partial u}{\partial y}. \end{cases} \qquad f'(z) = u_x + i v_x, \qquad f'(z) = v_y - i u_y$$

$$f^{(n)}(z_0) = \frac{n!}{2\ \pi\ i}\oint_C \frac{f(z)}{(z-z_0)^{n+1}}\ dz$$

Série de Laurent :

$$f(z) = \sum_{n=-\infty}^{\infty} a_n (z-z_0)^n \quad \text{où} \quad a_n = \frac{1}{2\pi i}\oint_{|w-z_0|=r} \frac{f(w)}{(w-z_0)^{n+1}}\ dw, \text{ avec } \quad r_1 \le r \le r_2.$$

$$\sin^2(\theta) = \frac{1-\cos(2\theta)}{2}, \qquad \cos^2(\theta) = \frac{1+\cos(2\theta)}{2}$$

$$\lim_{z\to z_0} (z-z_0)^n\ f(z)$$