Elementarne funkcije

$e^{z_1} \cdot e^{z_2} = e^{z_1+z_2}$ $\qquad e^{z+2\pi i} = e^z$ $\qquad (e^z)' = e^z$

$\sin^2 z + \cos^2 z = 1$ $\qquad e^{\pm iz} = \cos z \pm i \sin z$

$\sin(z_1 \pm z_2) = \sin z_1 \cos z_2 \pm \cos z_1 \sin z_2$ $\qquad \cos(z_1 \pm z_2) = \cos z_1 \cos z_2 \mp \sin z_1 \sin z_2$

$\sin(z + k\pi) = (-1)^k \sin z$ $\qquad \cos(z + k\pi) = (-1)^k \cos z$

$\sin z = 0 \Leftrightarrow z = k\pi$ $\qquad \cos z = 0 \Leftrightarrow z = \frac{1}{2}(2k+1)\pi$

$\sin' z = \cos z$ $\qquad \cos' z = -\sin z$

$\sin iz = i \operatorname{sh} z$ $\qquad \cos iz = \operatorname{ch} z$ $\qquad \operatorname{tg} iz = i \operatorname{th} z$

$\operatorname{sh} iz = i \sin z$ $\qquad \operatorname{ch} iz = \cos z$ $\qquad \operatorname{th} iz = i \operatorname{tg} z$

$\operatorname{ch}^2 z - \operatorname{sh}^2 z = 1$ $\qquad \operatorname{sh}' z = \operatorname{ch} z$ $\qquad \operatorname{ch}' z = \operatorname{sh} z$

$\operatorname{sh}(z_1 + z_2) = \operatorname{sh} z_1 \operatorname{ch} z_2 + \operatorname{ch} z_1 \operatorname{sh} z_2$ $\qquad \operatorname{ch}(z_1 + z_2) = \operatorname{ch} z_1 \operatorname{ch} z_2 + \operatorname{sh} z_1 \operatorname{sh} z_2$

$\sin z = \sin x \ \operatorname{ch} y + i \cos x \ \operatorname{sh} y$ $\qquad \cos z = \cos x \ \operatorname{ch} y - i \sin x \ \operatorname{sh} y$

$|\operatorname{sh} y| \leq |\sin z| \leq \operatorname{ch} y$ $\qquad |\operatorname{sh} y| \leq |\cos z| \leq \operatorname{ch} y$

$z^a = e^{a \operatorname{Ln} z}$, $z \in \mathbb{C} \setminus \{0\}$, $a \in \mathbb{C}$.

Taylorovi redovi elementarnih funkcija oko 0

$$e^z = \sum_{n=0}^{\infty} \frac{z^n}{n!} = 1 + z + \frac{z^2}{2} + \frac{z^3}{6} + \dots, \quad z \in \mathbb{C}$$

$$\sin z = \sum_{n=0}^{\infty} (-1)^n \frac{z^{2n+1}}{(2n+1)!} = z - \frac{z^3}{6} + \frac{z^5}{120} - \dots, \quad z \in \mathbb{C}$$

$$\cos z = \sum_{n=0}^{\infty} (-1)^n \frac{z^{2n}}{(2n)!} = 1 - \frac{z^2}{2} + \frac{z^4}{24} - \dots, \quad z \in \mathbb{C}$$

$$\operatorname{sh} z = \sum_{n=0}^{\infty} \frac{z^{2n+1}}{(2n+1)!} = z + \frac{z^3}{6} + \frac{z^5}{120} + \dots, \quad z \in \mathbb{C}$$

$$\operatorname{ch} z = \sum_{n=0}^{\infty} \frac{z^{2n}}{(2n)!} = 1 + \frac{z^2}{2} + \frac{z^4}{24} + \dots, \quad z \in \mathbb{C}$$

$$\ln(1+z) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{z^n}{n} = z - \frac{z^2}{2} + \frac{z^3}{3} - \dots, \quad |z| < 1$$

$$(1+z)^\alpha = \sum_{n=0}^{\infty} \binom{\alpha}{n} z^n = 1 + \alpha z + \frac{\alpha(\alpha-1)}{2} z^2 + \dots, \quad |z| < 1$$

$$\frac{1}{1-z} = \sum_{n=0}^{\infty} z^n = 1 + z + z^2 + z^3 + \dots, \quad |z| < 1$$

$$\frac{1}{1+z} = \sum_{n=0}^{\infty} (-1)^n z^n = 1 - z + z^2 - z^3 + \dots, \quad |z| < 1$$

Reziduum

Ako je a pol n–tog reda za funkciju f, tada je

$$res(f,a) = \frac{1}{(n-1)!} \lim_{z \to a} \frac{d^{n-1}}{dz^{n-1}}[(z-a)^n f(z)].$$

Reziduum funkcije f u beskonačnosti može se računati kao

$$res(f,\infty) = -res(\frac{1}{z^2} f(\frac{1}{z}), 0),$$

a ako je f analitička (holomorfna) u beskonačnosti i kao

$$res(f,\infty) = \lim_{z \to \infty} z(f(\infty) - f(z)) \text{ ili}$$

$$res(f,\infty) = -f_1'(0), \text{ gdje je } f_1(z) := f(\frac{1}{z}).$$