LIMITY:

$$\lim_{x\to a} c=c$$
$$\lim_{x\to a} x=a$$
$$\lim_{x\to 0^-}\frac{1}{x}=-\infty$$
$$\lim_{x\to 0^+}\frac{1}{x}=\infty$$
$$\lim_{x\to +\infty}\frac{1}{x}=0$$
$$\lim_{x\to -\infty}\frac{1}{x}=0$$
$$\lim_{x\to 0}\frac{1}{x}=\text{neex.}$$

pro $a\in(0,1)$
$$\lim_{x\to -\infty} a^x=+\infty$$
$$\lim_{x\to +\infty} a^x=0$$
$$\lim_{x\to 0^+}\log_a(x)=+\infty$$
$$\lim_{x\to +\infty}\log_a(x)=-\infty$$

pro $a\in(1,+\infty)$
$$\lim_{x\to -\infty} a^x=0$$
$$\lim_{x\to +\infty} a^x=+\infty$$
$$\lim_{x\to 0^+}\log_a(x)=-\infty$$
$$\lim_{x\to +\infty}\log_a(x)=+\infty$$

$$\lim_{x\to 0^+}\ln(x)=-\infty$$
$$\lim_{x\to +\infty}\ln(x)=+\infty$$

$$\lim_{x\to +\infty}\sin(x)=\text{neex.}$$
$$\lim_{x\to -\infty}\sin(x)=\text{neex.}$$
$$\lim_{x\to +\infty}\cos(x)=\text{neex.}$$
$$\lim_{x\to -\infty}\cos(x)=\text{neex.}$$

$$\lim_{x\to \frac{1}{2}\pi^-}\operatorname{tg}(x)=+\infty$$
$$\lim_{x\to \frac{1}{2}\pi^+}\operatorname{tg}(x)=-\infty$$
$$\lim_{x\to 0^-}\operatorname{cotg}(x)=-\infty$$
$$\lim_{x\to 0^+}\operatorname{cotg}(x)=+\infty$$
$$\lim_{x\to 0}\frac{\sin(x)}{x}=1$$
$$\lim_{x\to 0}\frac{\operatorname{tg}(x)}{x}=1$$
$$\lim_{x\to 0}\frac{e^x-1}{x}=1$$
$$\lim_{x\to 0}\frac{\ln(1+x)}{x}=1$$

L'HOSPITALOVO PRAVIDLO:

$$\lim_{x\to x_0}\frac{f(x)}{g(x)}=\frac{0}{0}\vee\frac{\infty}{\infty}\Rightarrow\lim_{x\to x_0}\frac{f'(x)}{g'(x)}$$

SLABIKÁŘ PRO LIMITY:

$$\lim_{x\to a} f(x)=+\infty \quad ;$$
$$\lim_{x\to a} g(x)=+\infty$$
$$\lim_{x\to a}[f(x)+g(x)]=+\infty$$
$$\lim_{x\to a}[f(x)\cdot g(x)]=+\infty$$

$$\lim_{x\to a} f(x)=-\infty \quad ;$$
$$\lim_{x\to a} g(x)=-\infty$$
$$\lim_{x\to a}[f(x)+g(x)]=-\infty$$
$$\lim_{x\to a}[f(x)\cdot g(x)]=-\infty$$??? - spíš +

$$\lim_{x\to a} f(x)=+\infty \quad ;$$
$$\lim_{x\to a} g(x)=-\infty$$
$$\lim_{x\to a}[f(x)+g(x)]=\text{neex.}$$
$$\lim_{x\to a}[f(x)\cdot g(x)]=-\infty$$

$$\lim_{x\to a} f(x)=+\infty \quad ; \quad k=\text{konst.}$$
$$\lim_{x\to a} k\cdot f(x)=+\infty \quad ; \quad k>0$$
$$\lim_{x\to a} k\cdot f(x)=-\infty \quad ; \quad k<0$$

$$\lim_{x\to a} f(x)=-\infty \quad ; \quad k=\text{konst.}$$
$$\lim_{x\to a} k\cdot f(x)=-\infty \quad ; \quad k>0$$
$$\lim_{x\to a} k\cdot f(x)=+\infty \quad ; \quad k<0$$

známé limity:
$$\lim_{x\to +\infty}\left(1+\frac{1}{x}\right)^x=e$$
$$\lim_{x\to +\infty}\left(1+\frac{c}{x}\right)^x=e^c$$
$$\lim_{x\to -\infty}\left(1+\frac{1}{x}\right)^x=e$$
$$\lim_{x\to 0}(1+x)^{\frac{1}{x}}=e$$

ÚPRAVY VZORCŮ:

$$a\frac{1}{a}=1 \quad ; \quad a\neq 0$$
$$\frac{1}{\sqrt[n]{a}}=a^{-\frac{1}{n}} \quad ; \quad a\neq 0 \quad ; \quad n\neq 0$$
$$\frac{a}{\sqrt{a}}=\sqrt{a} \quad ; \quad a\neq 0$$
$$1+\left(\frac{1-a}{a}\right)=\frac{1}{a} \quad ; \quad a\neq 0$$

odmocniny:
$$\sqrt[n]{a}\cdot\sqrt[n]{b}=\sqrt[n]{ab} \quad ; \quad a\geqslant 0 \wedge b\geqslant 0$$
$$a\cdot\sqrt[n]{b}=\sqrt[n]{a^n b} \quad ; \quad a\geqslant 0 \wedge b\geqslant 0$$
$$\frac{\sqrt[n]{a}}{\sqrt[n]{b}}=\sqrt[n]{\frac{a}{b}} \quad ; \quad a\geqslant 0 \wedge b\geqslant 0$$

$$(\sqrt[n]{a})^m=\sqrt[n]{a^m} \quad ; \quad a\geqslant 0$$
$$\sqrt[m]{\sqrt[n]{a}}=\sqrt[m\cdot n]{a} \quad ; \quad a\geqslant 0$$
$$\sqrt[n]{a}=\sqrt[k\cdot n]{a^k} \quad ; \quad a\geqslant 0 \wedge k\in\mathbb{N}$$

mocniny:
$$a^r\cdot a^s=a^{r+s}$$
$$\frac{a^r}{a^s}=a^{r-s} \quad ; \quad a\neq 0$$
$$(a^r)^s=a^{r\cdot s}$$
$$(a\cdot b)^r=a^r\cdot b^r$$
$$\left(\frac{a}{b}\right)^r=\frac{a^r}{b^r} \quad ; \quad b\neq 0$$
$$a^0=1 \quad ; \quad a\neq 0$$

$$a^{-m}=\frac{1}{a^m}$$
$$\sqrt{a}=\sqrt[2]{a^1}=a^{\frac{1}{2}}$$

rozklad trojčlenu:
$$ax^2+bx+c=a(x+x_1)(x-x_2)$$???
$$x^2+px+q=(x-x_1)(x-x_2)$$
$$-p=x_1+x_2 \quad ; \quad q=x_1\cdot x_2$$

$$(a+b)^2=a^2+2ab+b^2$$
$$(a-b)^2=a^2-2ab+b^2$$
$$(a+b)^3=a^3+3a^2b+3ab^2+b^3$$
$$(a-b)^3=a^3-3a^2b+3ab^2-b^3$$
$$a^2-b^2=(a+b)(a-b)$$
$$a^3+b^3=(a+b)(a^2-ab+b^2)$$

$$a^3-b^3=(a-b)(a^2+ab+b^2)$$

úpravy zlomků:
$$\frac{p}{q}+\frac{r}{s}=\frac{p\cdot s+r\cdot q}{q\cdot s}$$
$$\frac{p}{q}-\frac{r}{s}=\frac{p\cdot s-r\cdot q}{q\cdot s}$$
$$\frac{p}{q}\cdot\frac{r}{s}=\frac{p\cdot r}{q\cdot s}$$
$$\frac{p}{q}:\frac{r}{s}=\frac{p}{q}\cdot\frac{s}{r}=\frac{p\cdot s}{q\cdot r}$$

PYTAGOROVA VĚTA:

$$a^2+b^2=c^2$$

KVADRATICKÁ ROVNICE:

$$x_1,x_2=\frac{-b\pm\sqrt{D}}{2a} \qquad D=b^2-4ac$$

GONIOMETRICKÉ VZORCE:

$$\sin^2 x+\cos^2 x=1$$
$$\sin(x+y)=\sin x\cdot\cos y+\sin y\cdot\cos x$$
$$\sin(x-y)=\sin x\cdot\cos y-\sin y\cdot\cos x$$
$$\cos(x+y)=\cos x\cdot\cos y-\sin x\cdot\sin y$$
$$\cos(x-y)=\cos x\cdot\cos y+\sin x\cdot\sin y$$

$$\sin 2x=2\sin x\cdot\cos x$$
$$\cos 2x=\cos^2 x-\sin^2 x$$

$$\sin x+\sin y=2\sin\frac{x+y}{2}\cdot\cos\frac{x-y}{2}$$
$$\sin x-\sin y=2\cos\frac{x+y}{2}\cdot\sin\frac{x-y}{2}$$
$$\cos x+\cos y=2\cos\frac{x+y}{2}\cdot\cos\frac{x-y}{2}$$
$$\cos x-\cos y=-2\sin\frac{x+y}{2}\cdot\sin\frac{x-y}{2}$$

$$\operatorname{tg} x\cdot\operatorname{cotg} x=1$$
$$\operatorname{tg}(x+y)=\frac{\operatorname{tg} x+\operatorname{tg} y}{1-\operatorname{tg} x\cdot\operatorname{tg} y}$$
$$\operatorname{tg}(x-y)=\frac{\operatorname{tg} x-\operatorname{tg} y}{1+\operatorname{tg} x\cdot\operatorname{tg} y}$$
$$\operatorname{cotg}(x+y)=\frac{\operatorname{cotg} x\cdot\operatorname{cotg} y-1}{\operatorname{cotg} x+\operatorname{cotg} y}$$
$$\operatorname{cotg}(x-y)=\frac{\operatorname{cotg} x\cdot\operatorname{cotg} y+1}{\operatorname{cotg} x-\operatorname{cotg} y}$$
$$\operatorname{tg} 2x=\frac{2\operatorname{tg} x}{1-\operatorname{tg}^2 x}$$
$$\operatorname{cotg} 2x=\frac{\operatorname{cotg}^2 x-1}{2\operatorname{cotg} x}$$

$$\operatorname{tg} x=\frac{\sin x}{\cos x}$$
$$\operatorname{cotg} x=\frac{\cos x}{\sin x}$$
$$\operatorname{tg} x\cdot\operatorname{cotg} x=1$$
$$\operatorname{tg} x=\frac{1}{\operatorname{cotg} x}$$
$$\operatorname{cotg} x=\frac{1}{\operatorname{tg} x}$$
$$\sin x=\frac{a}{c}$$
$$\cos x=\frac{b}{c}$$
$$\operatorname{tg} x=\frac{a}{b}$$
$$\operatorname{cotg} x=\frac{b}{a}$$

	0°	30° $\left(\frac{\pi}{6}\right)$	45° $\left(\frac{\pi}{4}\right)$	60° $\left(\frac{\pi}{3}\right)$	90° $\left(\frac{\pi}{2}\right)$
$\sin x$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos x$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\operatorname{tg} x$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	neex.
$\operatorname{cotg} x$	neex.	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0

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

$$\cos k\pi=(-1)^k$$

DERIVACE:

$$f'(x_0)=\lim_{x\to x_0}\frac{f(x)-f(x_0)}{x-x_0}$$

funkce *f* má derivaci v *x₀* pokud limita existuje
derivace je směrnice tečny funkce

SLABIKÁŘ PRO DERIVACE:

$$(f+g)'(x)=f'(x)+g'(x)$$
$$(c\cdot f)'(x)=c\cdot f'(x)$$ - vytknutí
$$(f\cdot g)'(x)=f'(x)\cdot g(x)+f(x)\cdot g'(x)$$

neboli $(a\cdot b)'=a'\cdot b+a\cdot b'$
$$\left(\frac{f}{g}\right)'(x)=\frac{f'(x)\cdot g(x)-f(x)\cdot g'(x)}{g^2(x)}$$

neboli $\left(\frac{a}{b}\right)'=\frac{a'\cdot b-a\cdot b'}{b^2}$

$$f(x)^{g(X)}=e^{\ln f(x)^{g(x)}}=e^{g(x)*\ln f(x)}$$

$$(uvw)'=u'vw+uv'w+uvw'$$

$$y=x^n \qquad y'=n\cdot x^{n-1} \qquad (-\infty;+\infty)$$
$$y=e^x \qquad y'=e^x \qquad (-\infty;+\infty)$$
$$y=c \qquad y'=0 \qquad (-\infty;+\infty)$$
$$y=\sin x \qquad y'=\cos x \qquad (-\infty;+\infty)$$
$$y=\cos x \qquad y'=-\sin x \qquad (-\infty;+\infty)$$
$$y=\operatorname{tg} x \qquad y'=\frac{1}{\cos^2 x} \qquad \left(-\frac{\pi}{2}+k\pi;\frac{\pi}{2}+k\pi\right)$$
$$y=\operatorname{cotg} x \qquad y'=-\frac{1}{\sin^2 x} \qquad (k\pi;(k+1)\pi)$$
$$y=a^x \qquad y'=a^x\ln a \qquad a>0 \qquad a\neq 1 \qquad (-\infty;+\infty)$$
$$y=\ln x \qquad y'=\frac{1}{x} \qquad (0;+\infty)$$
$$y=\log_a x \qquad y'=\frac{1}{x\ln a} \qquad (0;+\infty)$$
$$y=\arcsin x \qquad y'=\frac{1}{\sqrt{1-x^2}} \quad \text{pro} \quad |x|<1$$
$$y=\arccos x \qquad y'=-\frac{1}{\sqrt{1-x^2}} \quad \text{pro} \quad |x|<1$$
$$y=\operatorname{arctg} x \qquad y'=\frac{1}{1+x^2}$$
$$y=\operatorname{arccotg} x \qquad y'=-\frac{1}{1+x^2}$$
$$y=\sinh x \qquad y'=\cosh x$$
$$y=\cosh x \qquad y'=\sinh x$$
$$y=\operatorname{tgh} x \qquad y'=\frac{1}{\cosh^x}$$
$$y=\operatorname{cotgh} x \qquad y'=-\frac{1}{\sinh^x}$$

LOGARITMICKÁ DERIVACE:
$$y=ax^x$$
$$\ln y=\ln a+x\ln x$$
$$\frac{1}{y}\cdot y'=\ln x+1$$
$$y'=ax^x(\ln x+1)$$

INTEGRÁLY:

integrační konstantu *c* nutno přičíst!

$$\int 0\,dx=c \qquad x\in(-\infty;+\infty)$$
$$\int 1\,dx=\int dx=x+c$$
$$\int k\,dx=k\int dx=kx+c$$ - vytknutí
$$\int x^n\,dx=\frac{x^{n+1}}{n+1}+c \qquad n\in\mathbb{N} \qquad x\in(-\infty;+\infty)$$
$$\int x^r\,dx=\frac{x^{r+1}}{r+1}+c \qquad n\in(-\infty;-1)\wedge(1;\infty)$$
$$x\in(0;+\infty)$$
$$\int\sin x\,dx=-\cos x+c$$
$$\int\cos x\,dx=\sin x+c$$
$$\int\frac{1}{x}\,dx=\ln|x|+c \qquad x\neq 0$$
$$\int\frac{1}{\sin^2 x}\,dx=-\operatorname{cotg} x+c$$
$$\int\frac{1}{\cos^2 x}\,dx=\operatorname{tg} x+c$$
$$\int e^x\,dx=e^x+c$$
$$\int a^x\,dx=\frac{a^x}{\ln a}+c$$
$$\int\frac{1}{x^2+a^2}\,dx=\frac{1}{a}\operatorname{arctg}\frac{x}{a}+c$$
$$\int\frac{1}{x^2-a^2}\,dx=\frac{1}{2a}\ln\frac{x-a}{x+a}+c \qquad |x|\neq|a|\wedge a>0$$
$$\int\frac{1}{\sqrt{a^2-x^2}}\,dx=\arcsin\frac{x}{a}+c \qquad x\neq a \qquad a>0$$
$$\int\frac{1}{\sqrt{x^2+b}}\,dx=\ln|x+\sqrt{x^2+b}|+c \qquad b\neq 0$$
$$\int\frac{f'(x)}{f(x)}\,dx=\ln|f(x)|+c$$
$$\int f(ax+b)\,dx=\frac{1}{a}F(ax+b)+c$$

Per partes:
$$\int uv'=uv-\int u'v$$

$$\int\frac{1}{ax^2+bx+c}\,dx=*$$
a) $D>0$ $\qquad *=\frac{1}{\sqrt{D}}\ln\frac{2ax+b-\sqrt{D}}{2ax+b+\sqrt{D}}+c$

b) $D=0$ $\qquad *=-\frac{2}{2ax+b}+c$

c) $D<0$ $\qquad *=\frac{2}{\sqrt{-D}}arctg\frac{2ax+b}{\sqrt{-D}}+c$

$$\int\frac{1}{\sqrt{ax^2+bx+c}}\,dx=*$$
a) $a>0$ $\qquad *=\frac{1}{\sqrt{a}}\ln|2ax+b+2\sqrt{a(ax^2+bx+c)}|+c$

b) $a<0$ $\qquad D>0$ $\qquad *=\frac{1}{\sqrt{-a}}\arcsin\frac{-2ax-b}{\sqrt{D}}+c$

SLABIKÁŘ PRO INTEGROVÁNÍ:
$$\int[f(x)\pm g(x)]\,dx=\int f(x)\,dx\pm\int g(x)\,dx$$
$$\int k\cdot f(x)\,dx=k\cdot\int f(x)\,dx \qquad k\in\mathbb{R}=\text{konst.}$$

Per partes:

$$\left.\begin{array}{l}\int P(x)\ \ln x\,dx\\ \int P(x)\,\mathrm{arctg}x\,dx\\ \int P(x)\,\mathrm{arcsin}x\,dx\end{array}\right\} u=\left\{\begin{array}{l}\ln x\\ \mathrm{arctg}\,x\\ \arcsin x\end{array}\right.$$

$$\left.\begin{array}{l}\int P(x)\ \cos x\,dx\\ \int P(x)\ \sin x\,dx\\ \int P(x)\ a^x\,dx\end{array}\right\}\quad u=P(x)$$

Gon.fce

univerzalna subs.

$tg\ \frac{x}{2}=t$

$dx=\frac{2}{1+t^2}\ dt$

$\sin x=\frac{2t}{1+t^2}$

$\cos x=\frac{1-t^2}{1+t^2}$

$\int R(\sin^2 x\,;\cos^2 x)$

$tg\ \frac{x}{2}=t$

$dx=\frac{2}{1+t^2}\ dt$

$\sin x=\frac{2t}{1+t^2}$

$\cos x=\frac{1-t^2}{1+t^2}$

Integral	Subs.
$R((ax+b);(ax+b)^{\frac{1}{k_1}};\dots)$	$x=t^{k\,(NSN)}$
$R(x,\sqrt{a^2-x^2})$	$x=asint\|\|acost$
$R(x,\sqrt{x^2+a^2})$	$x=a\ tg\ t$
$R(x,\sqrt{x^2-a^2})$	$x={}^{a}/_{sint}\,;{}^{a}/_{cost}$

$$\int\frac{Ax+B}{x^2+px+q}\,dx=\frac{A}{2}\ln|x^2+px+q|+\frac{B-A^{p}/_2}{\sqrt{q-{}^{p^2}/_4}}\,arctg\,\frac{x+{}^{p}/_2}{\sqrt{q-{}^{p^2}/_4}}+c$$

nerozlozitelny polynom D<0

$$\int\sqrt{x^2+b}\,dx=\frac{x}{2}\sqrt{x^2+b}+\frac{b}{2}\ln\left|x+\sqrt{x^2+b}\right|+c$$

$$\int\frac{A}{(x-a)^n}\,dx=\frac{A}{(1-n)(x-a)^{n-1}}+c\quad n>1\ x\neq a$$

$$\int t\sin(at)\,dt=\frac{1}{a^2}(\sin(at)-at\cos(at))+c$$

$$e^{jt}=\cos t+j\sin t$$

sin z = sin x cosh y + j cos x sinh y
cos z = cos x cosh y + j sin x sinh y

$$\sin z=\sum_{n=0}^{\infty}(-1)^n\frac{z^{2n+1}}{(2n+1)!}$$

$$\cos z=\sum_{n=0}^{\infty}(-1)^n\frac{z^{2n}}{(2n)!}$$

$$e^z\equiv\exp(z)=\sum_{n=0}^{\infty}\frac{z^n}{n!}$$

$$\cos z=\frac{\exp(jz)+\exp(-jz)}{2}$$

$$\sin z=\frac{\exp(jz)-\exp(-jz)}{2j}$$

C.R.podminky

$$u'_x=v'_y\ \ |\ \ u'_y=-v'_x$$

$$f(z)=u+jv$$

Diferecialne r.

$separovatelne\colon y'=\frac{dy}{dx}$

char.rovnica $\alpha^2+b_1\alpha+b_2=0$

$D>0: y=c_1e^{\alpha_1x}+c_2e^{\alpha_2x}$

$D=0: y=c_1e^{\alpha_1x}+c_2xe^{\alpha_1x}$

$D<0: y=e^{ax}(c_1\cos bx+\ c_2\sin bx)\ \ [\alpha=a\pm bj]$

$pre\colon\quad y'+f(x)y=g(x)$

$$y(x,c)=ce^{-\int f(x)dx}+e^{-\int f(x)dx}\int(g(x)e^{\int f(x)dx})dx$$

specialne prave strany:

$f(x)=e^{ax}\ P_n(x)$	$f(x)=e^{ax}\ (M\ cos\ bx+N\sin bx)$
$Y=e^{ax}\ x^k\ Q_n(x)$	$Y=e^{ax}\ x^k(A\ cos\ bx+B\sin bx)$
k je nas. korena a v ch.r.	k-nasobnost (a+bj) v ch.r.

FURIER

$$f(x)=\frac{a_0}{2}+\sum_{n=1}^{\infty}(a_n\cos n\omega t+b_n\sin n\omega t)=\frac{1}{2}[f(t^+)+f(t^-)]$$

$\omega=\frac{2\pi}{T}\qquad a_0=\frac{2}{T}\int_a^{a+T}f(t)\,dt$

$$a_n=\frac{2}{T}\int_a^{a+T}f(t)\cos n\omega t\ dt$$

$$b_n=\frac{2}{T}\int_a^{a+T}f(t)\sin n\omega t\ dt$$

$$sud\acute{a}-\ \boldsymbol{b_n}=0,\boldsymbol{a_n}=\frac{4}{T}\int_0^{T/2}f(t)\cos n\omega t\ dt\,,\boldsymbol{a_0}=\cdots$$

$$lich\acute{a}-\ \boldsymbol{a_n}=0,\boldsymbol{b_n}=\frac{4}{T}\int_0^{T/2}f(t)\sin n\omega t\ dt$$

tecna rovina:

$\tau\colon f'_x(T)(x-x_0)+f'_y(T)(y-y_0)-(z-z_0)=0\rightarrow explicitne$

$\tau\colon F'_x(T)(x-x_0)+F'_y(T)(y-y_0)+F'_z(T)(z-z_0)=0\rightarrow implicitne$

Z - transformace:

Rada Z{f(n)} konverguje, da sa integrovat a der. clen po clenu, je holomorfni

$|z|>R$, kde $R=\overline{lim}_{n\to\infty}\sqrt[n]{|f(n)|}$.

Zpetna Z-tr. (zk su poly)

$$f(n)=\mathcal{Z}^{-1}\{F(z)\}=\sum_{z_k}\operatorname*{res}_{z=z_k}\left[F(z)\ z^{n-1}\right],\quad n=0,1,2,\dots$$

Číslo vzorce	$f(n),\ \ n=0,1,2,\dots$	$\mathcal{Z}\{f(n)\}=F(z)=\sum_{n=0}^{\infty}f(n)z^{-n}$
1.	1	$\frac{z}{z-1}$
2.	a^n	$\frac{z}{z-a}$
3.	n	$\frac{z}{(z-1)^2}$
4.	n^2	$\frac{z(z+1)}{(z-1)^3}$
5.	na^n	$\frac{az}{(z-a)^2}$
6.	n^2a^n	$\frac{az(z+a)}{(z-a)^3}$
7.	$\cos\omega n$	$\frac{z(z-\cos\omega)}{z^2-2z\cos\omega+1}$
8.	$\sin\omega n$	$\frac{z\sin\omega}{z^2-2z\cos\omega+1}$
9.	$\delta_0(n)$	1
10.	$\delta_m(n)$	z^{-m}
11.	$f(n+1)$	$zF(z)-zf(0)$
12.	$f(n+2)$	$z^2F(z)-z^2f(0)-zf(1)$
13.	$f(n+k)$	$z^kF(z)-\Sigma_{j=0}^{k-1}f(j)z^{k-j}$
14.	$f(n-k)$	$z^{-k}F(z)$

Laplaceova transformace:

$$F(p)=\int_0^{\infty}f(t)\ e^{-pt}\ \mathrm{d}t$$

Číslo vzorce	$f(t)$	$\mathcal{L}\{f(t)\}=F(p)=\int_0^{\infty}f(t)e^{-pt}\,\mathrm{d}t$
1.	c	$\frac{c}{p}$
2.	$t^n,\ n\in\mathbb{N}$	$\frac{n!}{p^{n+1}}$
3.	e^{at}	$\frac{1}{p-a}$
4.	$t^ne^{at},\ n\in\mathbb{N}$	$\frac{n!}{(p-a)^{n+1}}$
5.	$\cos\omega t$	$\frac{p}{p^2+\omega^2}$
6.	$\sin\omega t$	$\frac{\omega}{p^2+\omega^2}$
7.	$e^{at}\cos\omega t$	$\frac{p-a}{(p-a)^2+\omega^2}$
8.	$e^{at}\sin\omega t$	$\frac{\omega}{(p-a)^2+\omega^2}$
9.	$f'(t)$	$pF(p)-f(0)$
10.	$f''(t)$	$p^2F(p)-pf(0)-f'(0)$
11.	$f'''(t)$	$p^3F(p)-p^2f(0)-pf'(0)-f''(0)$
12.	$f^{(n)}(t)$	$p^nF(p)-p^{n-1}f(0)-p^{n-2}f'(0)-\dots-f^{(n-1)}(0)$
13.	$\int_0^t f(u)\,\mathrm{d}u$	$\frac{F(p)}{p}$
14.	$f(t-a),\ a\geq 0$	$e^{-ap}F(p)$

Obraz ryze rac.fce (stM<stN)

$$F(p)=\frac{M(p)}{N(p)},\qquad f(t)=\mathcal{L}^{-1}\{F(p)\}=\sum_{p_k}\operatorname*{res}_{p=p_k}\left[F(p)\ e^{pt}\right],\quad t>0$$

Ak sú póly 2 komplexne zdruzene cisla, staci pocitat pre 1 koren

$$\operatorname*{res}_{p=\alpha+j\beta}\left[F(p)\ e^{pt}\right]+\operatorname*{res}_{p=\alpha-j\beta}\left[F(p)\ e^{pt}\right]=2\mathcal{R}e\operatorname*{res}_{p=\alpha+j\beta}\left[F(p)\ e^{pt}\right]$$

$posun\ obr.\colon Lap\{e^{at}\ f(t)\}=F(p-a)$

$zmena\ mer.\colon Lap\{f(at)\}=\frac{1}{a}F(\frac{p}{a})$

$spozdeni\ arg.\colon Lap\{f(t-\tau)\}=e^{-\tau\,p}F(p)$

Rezidua:

Pól 1.rádu: $\operatorname*{res}_{z=z_0}f(z)=\lim_{z\to z_0}(z-z_0)f(z)$

Pól m.rádu:

$$\operatorname*{res}_{z=z_0}f(z)=\frac{1}{(m-1)!}\lim_{z\to z_0}\frac{\mathrm{d}^{m-1}}{\mathrm{d}z^{m-1}}[(z-z_0)^mf(z)]$$

fce holomorfne, v nul. bode menovatela citatel nenulovy, derivacia menovatela v tom bode nenulova

$$\operatorname*{res}_{z=z_0}f(z)=\frac{\varphi(z_0)}{\psi'(z_0)}$$

Reziduova veta (pocitam v sing. bodoch uvnitr krivky (nie na krivke))

$$\int_\Gamma f(z)\,\mathrm{d}z=2\pi j\sum_{k=1}^{n}\operatorname*{res}_{z=z_k}f(z)$$

lom.fce $\frac{1}{f(z)}=0$

$riesenie\ su\ sing.body$

Integral komplexnej premennej:

$$\int_\Gamma f(z)\,\mathrm{d}z=\int_\alpha^\beta f(z(t))z'(t)\,\mathrm{d}t.$$

Parametrizace usecky o krajnich bodech z1, z2

$z(t)=z_1+(z_2-z_1)t,\quad t\in\langle 0,1\rangle$

OS X:

$z_1=\alpha,z_2=\beta$ je $z(t)=t,\ t\in\langle\alpha,\beta\rangle$

OS Y:

$z_1=\alpha j\,,z_2=\beta j\qquad z(t)=j\,t,\ t\in\langle\alpha,\beta\rangle$

Kladne orientovana kruznica, stred z0, polomer r

$z(t)=z_0+r\cdot e^{j\,t},\quad t\in\langle 0,2\pi\rangle$

Cauchyuv vzorec,veta:

$$\int_\Gamma\frac{f(z)}{z-z_0}\,\mathrm{d}z=\left\langle\begin{array}{l}2\pi j\,f(z_0),\quad \text{jestliže}\ \ z_0\ \text{leží uvnitř}\ \ \Gamma,\\ 0,\quad \text{jestliže}\ \ z_0\ \text{leží vně}\ \ \Gamma.\end{array}\right.$$

Ak sa mocnina menovatela nerova 1 (=^2,^3..), alebo pol >1. radu treba pouzit (alebo rezidua):

$$f^{(n)}(z)=\frac{n!}{2\pi j}\int_\Gamma\frac{f(\zeta)}{(\zeta-z)^{n+1}}\,d\zeta$$

Krivka holomorfna a v jednoducho. suv. oblasti (nezavisi na tvaru krivky)

$$\int_\Gamma f(z)\,\mathrm{d}z=F(z_2)-F(z_1)$$

Uzavreta krivka $\int_\Gamma f(z)\,\mathrm{d}z=0$