$(f(x)\pm g(x))' = f'(x)\pm g'(x)$ $\qquad (C\cdot f(x))' = C\cdot f'(x)$

$(f(x)\cdot g(x))' = f'(x)\cdot g(x) + f(x)\cdot g'(x)$

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

$(f(g(x)))' = f'(g)\cdot g'(x)$ $\qquad \left(\frac{df(x)}{dx}\right)_{x_0} = \left(\frac{1}{\frac{f^{-1}(y)}{dy}}\right)_{y_0=f(x_0)}$

$(C)' = 0$	$(x^a)' = a\cdot x^{a-1}$
$(\sin(x))' = \cos(x)$	$(\cos(x))' = -\sin(x)$
$(tg(x))' = \frac{1}{\cos^2(x)}$	$(ctg(x))' = -\frac{1}{\sin^2(x)}$
$(\arcsin(x))' = \frac{1}{\sqrt{1-x^2}}$	$(\arccos(x))' = -\frac{1}{\sqrt{1-x^2}}$
$(arctg(x))' = \frac{1}{1+x^2}$	$(e^x)' = e^x$ $\quad (\ln(x))' = \frac{1}{x}$
$(a^x)' = a^x\cdot\ln(a)$	$(\log_a(x))' = \frac{1}{x}\cdot\frac{1}{\ln(a)}$
$(sh(x))' = ch(x)$	$(ch(x))' = sh(x)$
$(arsh(x))' = \frac{1}{\sqrt{x^2+1}}$	$(arch(x))' = \frac{1}{\sqrt{x^2-1}}$

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érintö : $y = f(x_0) + f'(x_0)(x-x_0)$

simulókör : $y = f(x) \quad y''(x_0)\neq 0 \rightarrow \rho(x_0) = \left|\frac{\sqrt{1+y'^2(x_0)}^3}{y''(x_0)}\right|$

$u = x_0 - \frac{1+y'^2(x_0)}{y''(x_0)}y'(x_0) \qquad v = y(x_0) + \frac{1+y'^2(x_0)}{y''(x_0)}$

$x = x(t) \quad y = y(t) \quad t = t_0 \, helyen \rightarrow \rho = \left|\frac{\sqrt{\dot{x}^2+\dot{y}^2}^3}{\dot{x}\ddot{y}-\dot{y}\ddot{x}}\right|$

$u = x - \dot{y}\frac{\dot{x}^2+\dot{y}^2}{\dot{x}\ddot{y}-\dot{y}\ddot{x}} \qquad u = y + \dot{x}\frac{\dot{x}^2+\dot{y}^2}{\dot{x}\ddot{y}-\dot{y}\ddot{x}}$

érintösík : $z = f(x_0,y_0) + f'_x(x_0,x_0)(x-x_0) + f'_y(x_0,y_0)(y-y_0)$

$\int_g f(x,y,z)\,ds = \int_{t=a}^{b} f(x(t),y(t),z(t))\sqrt{(\dot{x}(t))^2+(\dot{y}(t))^2+(\dot{z}(t))^2}\,dt$

$\int_g f(x,y,z)\,dx = \int_{t=a}^{b} f(x(t),y(t),z(t))\,\dot{x}(t)\,dt$

$\sin(x) = \sum \frac{(-1)^n\cdot x^{2n+1}}{(2n+1)!} \qquad (1+x)^a = \sum \binom{a}{n} x^n$

$\cos(x) = \sum \frac{(-1)^n\cdot x^{2n}}{(2n)!} \qquad \binom{a}{n} = \frac{a\cdot(a-1)\cdot(a-2)\cdot\ldots\cdot(a-n+1)}{n!}$

$\frac{1}{1-x} = \sum x^n$

$e^x = \sum \frac{x^n}{n!}$

$\begin{bmatrix} t = tg\frac{x}{2} & helyettesítés \\ x = 2\mathrm{arctg}(t) & dx = \frac{2dt}{1+t^2} \\ \sin(x) = \frac{2t}{1+t^2} & \cos(x) = \frac{1-t^2}{1+t^2} \end{bmatrix}$

$\begin{bmatrix} t = e^x & helyettesítés \\ x = \ln(t),\ t>0 & dx = \frac{dt}{t} \end{bmatrix}$

$\begin{bmatrix} t = \arcsin(x) & \sqrt{1-x^2} = \cos(t) & x = \sin(t) & dx = \cos(t)\,dt \\ t = arsh(x) & \sqrt{1+x^2} = ch(t) & x = sh(t) & dx = ch(t)\,dt \\ t = arch(x) & x\geqslant 0, \sqrt{x^2-1} = sh(t) & x = ch(t) & dx = sh(t)\,dt \\ t = arch(-x) & x\leqslant 0, \sqrt{x^2-1} = sh(t) & x = -ch(t) & dx = -sh(t)\,dt \end{bmatrix}$

$a_n = \frac{2}{p}\int_0^p f(x)\cos\left(\frac{2n\pi}{p}x\right)dx \qquad b_n = \frac{2}{p}\int_0^p f(x)\sin\left(\frac{2n\pi}{p}x\right)dx$

$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty}\left(a_n\cos\left(\frac{2n\pi}{p}x\right) + b_n\sin\left(\frac{2n\pi}{p}x\right)\right)$

$L\{f(t)\} = \int_0^{\infty} e^{-st} f(t)\,dt \qquad f(t-T)\rightarrow e^{-T\cdot s}\cdot f(s)$

$e^{a\cdot t}\rightarrow\frac{1}{s-a}$	$\sin(a\cdot t)\rightarrow\frac{a}{s^2+a^2}$	$e^{a\cdot t}\cdot f(t)\rightarrow f(s-a)$
	$\cos(a\cdot t)\rightarrow\frac{s}{s^2+a^2}$	$t^n\cdot f(t)\rightarrow(-1)^n\cdot\frac{d^n f(s)}{ds^n}$
$1(t)\rightarrow\frac{1}{s}$	$sh(a\cdot t)\rightarrow\frac{a}{s^2-a^2}$	$(f(t))'\rightarrow s\cdot f(s) - f(0)$
$t^n\rightarrow\frac{n!}{s^{n+1}}$	$ch(a\cdot t)\rightarrow\frac{s}{s^2-a^2}$	$(f(t))''\rightarrow s^2\cdot f(s) - s\cdot f(0) - f'(0)$

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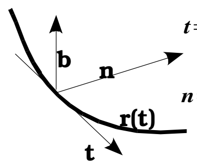

$$\boldsymbol t=\frac{\dot{\boldsymbol r}}{|\dot{\boldsymbol r}|}\qquad \boldsymbol b=\frac{\dot{\boldsymbol r}\times\ddot{\boldsymbol r}}{|\dot{\boldsymbol r}\times\ddot{\boldsymbol r}|}\qquad \boldsymbol n=\boldsymbol b\times\boldsymbol t$$

$$\boldsymbol r(t)=x(t)\boldsymbol i+y(t)\boldsymbol j+z(t)\boldsymbol k$$
$$\dot{\boldsymbol r}(t)=\dot x(t)\boldsymbol i+\dot y(t)\boldsymbol j+\dot z(t)\boldsymbol k$$
$$\ddot{\boldsymbol r}(t)=\ddot x(t)\boldsymbol i+\ddot y(t)\boldsymbol j+\ddot z(t)\boldsymbol k$$

$$s=\int_a^b|\dot{\boldsymbol r}(t)|dt=\int_a^b\sqrt{\dot x^2+\dot y^2+\dot z^2}\,dt$$

$$\underset{(görbület)}{g}=\frac{|\dot{\boldsymbol r}\times\ddot{\boldsymbol r}|}{|\dot{\boldsymbol r}|^3}\qquad \underset{(torzió)}{c}=\frac{\dot{\boldsymbol r}\,\ddot{\boldsymbol r}\,\ddot{\boldsymbol r}}{|\dot{\boldsymbol r}\times\ddot{\boldsymbol r}|^2}\qquad \underset{(simulókör\ sugár)}{\rho}=\frac{1}{g}\qquad \underset{(simulókör\ kzp)}{\boldsymbol R}=\boldsymbol r+\frac{1}{g}\boldsymbol n$$

$$u(\boldsymbol r)=u(x,y,z)\qquad \nabla u=\boldsymbol{grad}\,u=\frac{\partial u}{\partial x}\boldsymbol i+\frac{\partial u}{\partial y}\boldsymbol j+\frac{\partial u}{\partial z}\boldsymbol k$$

$$\boldsymbol v(\boldsymbol r)=v_x(x,y,z)\boldsymbol i+v_y(x,y,z)\boldsymbol j+v_z(x,y,z)\boldsymbol k$$

$$áramvonalak:\ \frac{\partial x}{v_x}=\frac{\partial y}{v_y}=\frac{\partial z}{v_z}$$

$$(\boldsymbol u+\boldsymbol v)'=\boldsymbol u'+\boldsymbol v'$$
$$(u\boldsymbol v)'=\boldsymbol v\circ\boldsymbol{grad}\,u+u\boldsymbol v'$$
$$(\boldsymbol u\boldsymbol v)'=\boldsymbol v\boldsymbol u'+\boldsymbol u\boldsymbol v'$$
$$(\boldsymbol u\times\boldsymbol v)'=-\boldsymbol v\times\boldsymbol u'+\boldsymbol u\times\boldsymbol v'$$
$$\frac{d}{\boldsymbol r}\boldsymbol u(\boldsymbol v(\boldsymbol r))=\frac{d\boldsymbol u}{d\boldsymbol v}\frac{d\boldsymbol v}{d\boldsymbol r}$$

$$\boldsymbol v'=\underset{derivált tenzor}{\frac{d\boldsymbol v}{d\boldsymbol r}}=\boldsymbol D=\begin{bmatrix}\frac{\partial v_x}{\partial x}&\frac{\partial v_x}{\partial y}&\frac{\partial v_x}{\partial z}\\ \frac{\partial v_y}{\partial x}&\frac{\partial v_y}{\partial y}&\frac{\partial v_y}{\partial z}\\ \frac{\partial v_z}{\partial x}&\frac{\partial v_z}{\partial y}&\frac{\partial v_z}{\partial z}\end{bmatrix}$$

$$div\,\boldsymbol v=\nabla\boldsymbol v=\frac{\partial v_x}{\partial x}+\frac{\partial v_y}{\partial y}+\frac{\partial v_z}{\partial z}$$

$$\boldsymbol{rot}\,\boldsymbol v=\nabla\times\boldsymbol v=\begin{vmatrix}\boldsymbol i&\boldsymbol j&\boldsymbol j\\ \frac{\partial}{\partial x}&\frac{\partial}{\partial y}&\frac{\partial}{\partial z}\\ v_x&v_y&v_z\end{vmatrix}$$

$$div(\boldsymbol u+\boldsymbol v)=div\,\boldsymbol u+div\,\boldsymbol v$$
$$rot(\boldsymbol u+\boldsymbol v)=\boldsymbol{rot}\,\boldsymbol u+\boldsymbol{rot}\,\boldsymbol v$$
$$div(u\boldsymbol v)=\boldsymbol v\,\boldsymbol{grad}\,u+u\,div\,\boldsymbol v$$
$$\boldsymbol{rot}(u\boldsymbol v)=u\,\boldsymbol{rot}\,\boldsymbol v+\boldsymbol v\,\boldsymbol{grad}\,u$$
$$div(\boldsymbol u\times\boldsymbol v)'=\boldsymbol v\,\boldsymbol{rot}\,\boldsymbol u-\boldsymbol u\,\boldsymbol{rot}\,\boldsymbol v$$
$$rot(\boldsymbol u\times\boldsymbol v)'=\boldsymbol v(\nabla\circ\boldsymbol u)-\boldsymbol v\,div\,\boldsymbol v+\boldsymbol u\,div\,\boldsymbol v-\boldsymbol u(\nabla\circ\boldsymbol v)$$
$$\boldsymbol{rot}\,\boldsymbol{rot}\,\boldsymbol v=\boldsymbol{grad}\,div\,\boldsymbol v-\Delta\boldsymbol v$$
$$\boldsymbol{rot}\,\boldsymbol{grad}\,u=\boldsymbol 0$$
$$div\,\boldsymbol{rot}\,\boldsymbol v=0$$

$$\Delta=\nabla\nabla=\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}+\frac{\partial^2}{\partial z^2}$$

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$$\int f(x)\pm g(x)\,dx=\int f(x)\,dx\pm\int g(x)\,dx$$
$$\int C\cdot f(x)\,dx=C\cdot\int f(x)\,dx$$
$$\int f'(x)\cdot g(x)\,dx=f(x)\cdot g(x)-\int f(x)\cdot g'(x)\,dx$$
$$\int f(g(x))\cdot g'(x)\,dx=F(g(x)),\ ha\ F'(x)=f(x)$$
$$\int f(ax+b)\,dx=\frac{F(ax+b)}{a},\ ha\ F'(x)=f(x)$$
$$\int f'(x)\cdot f^a(x)\,dx=\frac{f^{a+1}(x)}{a+1},\ a\neq-1$$
$$\int\frac{f'(x)}{f(x)}\,dx=\ln|f(x)|$$

$$\int x^a\,dx=\frac{x^{a+1}}{a+1},\ a\neq-1\qquad \int\frac{1}{x}\,dx=\ln|x|$$
$$\int a^x\,dx=\frac{a^x}{\ln(a)}\ ha\ a>0\ és\ a\neq1\qquad \int e^x\,dx=e^x$$
$$\int\sin(x)\,dx=-\cos(x)\qquad \int\cos(x)\,dx=\sin(x)$$
$$\int\frac{1}{\cos^2(x)}\,dx=tg(x)\qquad \int\frac{1}{\sin^2(x)}\,dx=-ctg(x)$$
$$\int\frac{1}{\sqrt{1-x^2}}\,dx=\arcsin(x)\qquad \int\frac{-1}{\sqrt{1-x^2}}\,dx=\arccos(x)$$
$$\int\frac{1}{1+x^2}\,dx=arctg(x)\qquad \int\frac{-1}{1+x^2}\,dx=arcctg(x)$$
$$\int ch(x)\,dx=sh(x)\qquad \int sh(x)\,dx=ch(x)$$
$$\int\frac{1}{ch^2(x)}\,dx=th(x)\qquad \int\frac{1}{sh^2(x)}\,dx=-cth(x)$$
$$\int\frac{1}{\sqrt{x^2+1}}\,dx=arsh(x)\qquad \int\frac{1}{\sqrt{x^2-1}}\,dx=arch(x)$$
$$\int\frac{1}{1-x^2}\,dx=\begin{matrix}arth(x)\ ha\ |x|<1\\ arcth(x)\ ha\ |x|>1\end{matrix}$$

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