$$\left(x^{\alpha}\right)' = \alpha \cdot x^{\alpha-1}$$
$$\left(e^{x}\right)' = e^{x}$$
$$\left(a^{x}\right)' = a^{x} \cdot \log a$$
$$(\log x)' = \frac{1}{x}$$

$$(\sin x)' = \cos x$$
$$(\cos x)' = -\sin x$$
$$(\operatorname{tg} x)' = \frac{1}{\cos^{2} x} = 1 + \operatorname{tg}^{2} x$$
$$(\operatorname{ctg} x)' = -\frac{1}{\sin^{2} x} = -\left(1 + \operatorname{ctg}^{2} x\right)$$

$$f(x)^{g(x)} = e^{g(x) \cdot \log f(x)}$$

$$e^{-\frac{y}{x}} \xrightarrow{po\ x} e^{-\frac{y}{x}}$$
$$e^{\frac{y}{x}} \xrightarrow{po\ x} e^{\frac{y}{x}}\left(\right.$$

$$(\arcsin x)' = \frac{1}{\sqrt{1-x^{2}}}$$
$$(\arccos x)' = -\frac{1}{\sqrt{1-x^{2}}}$$
$$(\arctan x)' = \frac{1}{1+x^{2}}$$
$$(\operatorname{arcctan} x)' = -\frac{1}{1+x^{2}}$$

$$(\sinh x)' = \cosh x$$
$$(\cosh x)' = -\sinh x$$
$$(\operatorname{tgh} x)' = \frac{1}{\cosh^{2} x} = 1 + \operatorname{tgh}^{2} x$$
$$(\operatorname{ctgh} x)' = -\frac{1}{\sinh^{2} x} = -\left(1 + \operatorname{ctgh}^{2} x\right)$$

$$(\operatorname{arcsinh} x)' = \frac{1}{\sqrt{1+x^{2}}}$$
$$(\operatorname{arccosh} x)' = -\frac{1}{\sqrt{1+x^{2}}}$$
$$(\operatorname{arctanh} x)' = \frac{1}{1-x^{2}}$$
$$(\operatorname{arcctanh} x)' = -\frac{1}{1-x^{2}}$$

$$\sin^{2}(\arccos x) = 1 - \cos^{2}(\arccos x) = 1 - x^{2}$$
$$\cos(\arccos x) = x$$
$$\cos^{2}(\arccos x) = [\cos(\arccos x)]^{2} = x^{2}$$

$$\sin^{2} x = \frac{1 - \cos 2x}{2}$$
$$\cos^{2} x = \frac{\quad}{2}$$

$f(x,y)=(f_1(x,y),f_2(x,y)) = \text{npr.}(x-y, x+y)$

$$Df(x,y)=\begin{bmatrix} \frac{\partial f_1}{\partial x} & \frac{\partial f_1}{\partial y} \\ \frac{\partial f_2}{\partial x} & \frac{\partial f_2}{\partial y} \end{bmatrix}$$

$F(x,y)=f(g(x,y))$

$F'(x,y)=f'(g(x,y))\cdot g'(x,y)$

$DF(x,y)=Df(g(x,y))\cdot Dg(x,y)$

$\frac{\partial F}{\partial x}=\frac{\partial f}{\partial u}\cdot\frac{\partial u}{\partial x}+\frac{\partial f}{\partial v}\cdot\frac{\partial v}{\partial x}$ $\frac{\partial F}{\partial y}=\frac{\partial f}{\partial u}\cdot\frac{\partial u}{\partial y}+\frac{\partial f}{\partial v}\cdot\frac{\partial v}{\partial y}$

Izrek o implicitni funkciji:

$f(x_0, g(x))=0$ 1) $f(x_0,y_0)=0$ 2) $\frac{\partial f}{\partial x}(x_0,y_0)\neq 0$

Po izreku o implicitni funkciji vemo, da taka funkcija obstaja.

$$\frac{\partial g}{\partial x}(x)=-\frac{\frac{\partial f}{\partial x}(x,g(x))}{\frac{\partial f}{\partial y}(x,g(x))}$$

Hessova matrika:

$$Hf(x,y)=\begin{bmatrix} f_{xx}(x,y) & f_{xy}(x,y) \\ f_{yx}(x,y) & f_{yy}(x,y) \end{bmatrix}$$

$\lambda_1<0$; $\lambda_2<0$ $\Rightarrow$ lokalni maksimum D>0

$\lambda_1<0$; $\lambda_2>0$ $\Rightarrow$ točka je sedlo D=0 natanko tedaj ima sistem eno netrivialno rešitev

$\lambda_1>0$; $\lambda_2>0$ $\Rightarrow$ lokalni minimum D<0

pozitivna definitna → simetrična, vsi členi so pozitivni,

negativno definitna → simetrična, vsi členi so negativni, predznako determinante so -,+,-,+,-

Vezani ekstremi:

Naklon tangente $-\frac{\frac{\partial f}{\partial x}(x_0,y_0)}{\frac{\partial f}{\partial y}(x_0,y_0)}$ gradient kaže pravokotno na izohipso $\nabla f=\lambda\cdot\nabla g$

Po Lagrangeu definiramo:

$F(x,y)=f(x,y)-\lambda\cdot g(x,y)$

$F_x(x,y)=0$ $g(x,y)=c$

$F_y(x,y)=0$