$$\int_a^b |f|\,dx$$

$$\int_0^\infty \underbrace{\frac{(\operatorname{arccot} x)^2}{\arctan \sqrt{x}}}_{f}\,dx$$

f spoj. na $(0,\infty)$

$$\int_0^1 \frac{(\operatorname{arccot} x)^2}{\arctan\sqrt{x}}\,dx \quad \int_1^\infty$$

dodefinovat nelze :-(chová se jako

$[0,1]$ $(\operatorname{arccot} x)^2 \approx \left(\frac{\pi}{2}\right)^2$

LSK $g(x) = \dfrac{\left(\frac{\pi}{2}\right)^2}{\sqrt{x}}$ $\arctan\sqrt{x} \approx \sqrt{x}$

$$\lim_{x\to 0+} \frac{f}{g} = \lim_{x\to 0+} \frac{\frac{(\operatorname{arccot} x)^2}{\arctan\sqrt{x}}}{\frac{\left(\frac{\pi}{2}\right)^2}{\sqrt{x}}} = 1 \in (0,\infty)$$

$$\int_0^1 f \ \text{K} \iff \int_0^1 g\,\text{K} = \int_0^1 \frac{\left(\frac{\pi}{2}\right)^2}{\sqrt{x}}\,dx \ \text{K} :-)$$

$$\to \int_0^1 f \ \text{AK} \ :-)$$

$$\int_1^\infty \underbrace{\frac{(\operatorname{arccot} x)^2}{\arctan\sqrt{x}}}_{f}\,dx$$

spoj. na $[1,\infty)$

$$g = \frac{\frac{1}{x^2}}{\pi/2} = \frac{2}{\pi x^2} \qquad (\operatorname{arccot} x)^2 \approx \left(\frac{1}{x}\right)^2 \qquad \arctan\sqrt{x} \approx \frac{\pi}{2}$$

$$\lim_{x\to\infty} \frac{\frac{(\operatorname{arccot} x)^2}{\arctan\sqrt{x}}}{\frac{2}{\pi x^2}} = 1 \in (0,\infty)$$

$$\int_1^\infty f \ \text{K} \iff \int_1^\infty g\ \text{K} \qquad \int_1^\infty \frac{2}{\pi x^2}\ \text{K} :-)$$

$$\int_1^\infty f \ \text{KA}$$

Závěr $\int_0^1 f\ \text{AK}$ $\int_1^\infty f\ \text{AK}$ $\Rightarrow \int_0^\infty f\ \text{AK} :-)$

$$\lim_{x\to\infty} \frac{\operatorname{arccot} x}{x^\beta} \overset{\text{l'H}}{=} \text{"}\frac{0}{\infty}\text{"} \qquad \beta > 0 \qquad \text{"}\frac{0}{0}\text{"}$$

$$\lim_{x\to\infty} \frac{\frac{-1}{1+x^2}}{\beta x^{\beta-1}} = \lim \frac{\frac{-1}{1+x^2}}{-1\cdot\frac{1}{x^2}} = 1$$

$$\beta - 1 = -2 \qquad x^{\beta-1} = \frac{1}{x^2}$$

$$\boxed{\beta = -1}$$

$$\boxed{\frac{1}{x}}$$

$$\int_0^\infty \frac{x^p}{1+x^q}\,dx$$

$$\int_0^1 \frac{x^p}{1+x^q}\,dx \qquad \int_1^\infty \frac{x^p}{1+x^q}\,dx$$

$$\frac{x^3}{1+x^2}$$

$$\int_1^\infty \frac{x^3}{1+x^2} \quad \text{LSK} \quad \frac{x^3}{x^2} = x$$

$\boxed{q \geq 0}$

$$\int_1^\infty \frac{x^p}{1+x^q} \quad \text{LSK} \quad g = \frac{x^p}{x^q}$$

$$\lim_{x\to\infty} \frac{\frac{x^p}{1+x^q}}{\frac{x^p}{x^q}} = \lim_{x\to\infty} \frac{x^q}{1+x^q} = \begin{cases} 1 & q>0 \\ \frac{1}{2} & q=0 \end{cases}$$

$$\int_1^\infty f \ \text{K} \iff \int_1^\infty x^{p-q}$$

$\boxed{p-q<-1}$

$$\int_1^\infty \frac{x^7}{1+x^{-4}}\,dx \qquad \boxed{1}+\frac{1}{x^4}$$

LSK: $\frac{x^7}{1}$

$\boxed{q<0}$

$$\frac{x^p}{1} = g(x)$$

$$\lim_{x\to\infty} \frac{\frac{x^p}{1+x^q}}{x^p} = \frac{1}{1+0} = 1$$

$$\int f \ \text{K1} \iff \int_1^\infty x^p \ \text{K1} \iff \boxed{p<-1}$$

$$\int_0^1 \frac{x^p}{1+x^q}\,dx$$

$$\int_0^1 \frac{x^2}{1+x^3}\,dx \quad \text{spojito :)}$$

$$\int_0^1 \frac{\frac{1}{x^2}}{1+x^3}\,dx \quad g = \frac{1}{x^2}$$

$$\int_0^1 \frac{x^2}{1+1/x^3} = \int \frac{x^2}{\frac{x^3+1}{x^3}}$$

$$= \int \frac{x^2 x^3}{1+x^3} \quad g = \frac{x^5}{1}$$

$$\int_0^1 \frac{\frac{1}{x^2}}{1+1/x^3}\,dx \quad g(x) = \frac{\frac{1}{x^2}}{\frac{1}{x^3}}$$

$$\int_0^1 \frac{x^p}{1+x^q}$$

roste rychleji 1 nebo x^q

$\boxed{q \geq 0}$ $\boxed{1}$ $\quad$ $\boxed{q<0}$ x^q

$g(x) = x^p \qquad g(x) = \frac{x^p}{x^q}$

LSK

$$\int_0^1 f \ \text{K1} \quad \int_0^1 x^p \ \text{K} \qquad \int_0^1 x^{p-q} \ \text{K}$$

$\boxed{p>-1} \qquad \boxed{p-q>-1}$

$q>0$ & $p>-1$ $p-q<-1$ $\quad$ nebo $\quad$ $q<1$ & $p-q>-1$ $p<-1$

$$\int_1^\infty \frac{1}{\sqrt{1+x^3}}\,dx \begin{cases} S_k \leq \dfrac{1}{\sqrt{x^3}} \\ \\ 2S_k \quad \displaystyle\int \frac{1}{\sqrt{x^3}} \end{cases}$$