Parc. zlomky 2

$$\int \frac{1}{3+x} + \frac{x}{(x^2+2x+2)^2}\,dx$$

$$\int \frac{x^4+4x^3+9x^2+11x+4}{(x+3)(x^2+2x+2)^2}\,dx = \int \frac{A}{x+3} + \frac{Bx+C}{(x^2+2x+2)^1} + \frac{Dx+E}{(x^2+2x+2)^2}\,dx$$

A / 1 ; $Bx+C$ / $0x+0$; $Dx+E$ / $1x+0$

- st P < st Q
  $4 < 5$
- nelze rozložit

$$\int \frac{1}{x+3}\,dx \overset{C}{=} \ln|x+3|$$

$$\int \frac{x}{(x^2+2x+2)^2}\,dx = \int \underbrace{\frac{1}{2}\frac{2x+2}{(x^2+2x+2)^2}} + \frac{1}{2}\frac{-2}{(x^2+2x+2)^2}\,dx$$

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

$y = x^2+2x+2$

$dy = 2x+2\,dx$

$$\int \frac{1}{2}\cdot\frac{1}{y^2}\,dy \overset{C}{=} \frac{1}{2}\cdot -y^{-1} = \frac{-1}{2(x^2+2x+2)}$$

$$\int \frac{-1}{(x^2+2x+2)^2}\,dx = \int \frac{-1}{((x+1)^2+1)^2}\,dx =$$

1.V. Substituce.

$t = x+1 = \varphi(x)$ $\quad x \in (-\infty,\infty)$

$dt = 1\,dx$ $\quad \varphi(\mathbb{R}) = (-\infty,\infty)$

$f(t)$

$$= -\int \underbrace{\frac{1}{(t^2+1)^2}} \overset{C}{=} -\left(\frac{t}{2\cdot 1(1+t^2)^1} + \frac{2\cdot 1-1}{2\cdot 1}\int \frac{1}{1+t^2}\right)$$

I_2 $\qquad$ arctan t

$n \nearrow 1+1$

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

$$= \frac{-1}{2}\frac{x+1}{1+(x+1)^2} + \frac{-1}{2}\arctan(x+1)$$

$x \neq -3$

Závěr:

$$\overset{C}{=} \ln|x+3| + \frac{-1}{2}\cdot\frac{1}{x^2+2x+2} - \frac{1}{2}\frac{x+1}{x^2+2x+2} - \frac{1}{2}\arctan(x+1)$$

cheano va R

$$\int \frac{1}{(x^2+1)^2}\,dx = \int \frac{1}{(1+\tan^2 t)^2}\cdot\frac{1}{\cos^2 t}\,dt$$

$x = \tan t$ ← $\varphi(t)$ $\qquad \frac{1}{\cos^2}$ $\qquad t = \arctan x$

$$dx = \frac{1}{\cos^2 t}\,dt \qquad \neq 0$$

$$= \int \cos^4 t\,dt = \int \cos^3 t\,dt \overset{c}{=} \frac{1}{2}t + \frac{1}{2}\frac{\sin 2t}{2}$$

$(-\frac{\pi}{2}, \frac{\pi}{2})$ $\qquad \frac{1+\cos 2t}{2}$

$$= \frac{1}{2}t + \frac{1}{2}\sin t\cos t$$

$$= \frac{1}{2}\arctan x + \frac{1}{2}\frac{x}{1+x^2} \rightarrow \text{va } (a,b) = \mathbb{R}\,!$$

$t \in (-\frac{\pi}{2}, \frac{\pi}{2})$ $\qquad \varphi(-\frac{\pi}{2}, \frac{\pi}{2}) = \mathbb{R} = (a,b)$