$f(x) = \operatorname{arccotg} \frac{x-2}{x}$ $\qquad D_f = \mathbb{R} \setminus \{0\}$

$$\lim_{x \to 0_+} \operatorname{arccotg} \frac{x-2}{x} = \operatorname{arccotg} \frac{(-2)}{0_+} = \pi$$

$$\lim_{x \to 0_-} \operatorname{arccotg} \frac{x-2}{x} = \operatorname{arccotg} \frac{(-2)}{0_-} = 0$$

$$\lim_{x \to +\infty} \operatorname{arccotg} \frac{x-2}{x} = \operatorname{arccotg} \left(\lim_{x \to +\infty} \left(1 - \frac{2}{x}\right) \right) = \operatorname{arccotg} 1 = \frac{\pi}{4}$$

$$\lim_{x \to -\infty} \operatorname{arccotg} \frac{x-2}{x} = \operatorname{arccotg} \left(\lim_{x \to -\infty} \left(1 - \frac{2}{x}\right) \right) = \operatorname{arccotg} 1 = \frac{\pi}{4}$$

$$f'(x) = -\frac{1}{\left(\frac{x-2}{x}\right)^2 + 1} \cdot \frac{x-(x-2)}{x^2} = -\frac{2}{(x-2)^2 + x^2} = -\frac{2}{x^2 - 4x + 4 + x^2} =$$

$$= -\frac{1}{x^2 - 2x + 2} < 0 \quad \forall x \in D_f, \text{ neboť } \forall x \in \mathbb{R}: x^2 - 2x + 2 > 0$$

$\forall x \in D_f: f'(x) < 0 \implies$ funkce f je klesající

$$f''(x) = \frac{2x-2}{(x^2-2x+2)^2}$$

$\frown \quad \frown \quad \smile$

$f'' < 0 \quad 0 \quad f'' < 0 \quad 1 \quad f'' > 0$

$f''(x) = 0 \iff 2x - 2 = 0$

$\underline{x = 1}$ - inflexní bod

$\forall x \in (-\infty, 0) \cup (0, 1): f''(x) < 0 \implies$ funkce f je konkávní

$\forall x \in (1, \infty): f''(x) > 0 \implies$ funkce f je konvexní