$$\lim_{x\to-\infty} \frac{\sin x}{x} = 0 \quad \text{omez. mizející}$$

$$\lim_{x\to 0} \frac{\sin x}{x} = 1$$

$$\lim_{x\to\infty} (\cos x + 2x) = \infty$$

$$\lim_{x\to\infty} (5x + x\cdot\sin x) = x(5+\sin x) = \infty \; (\infty \cdot \text{omezená kladná})$$

$$\lim_{x\to\infty} \frac{\operatorname{arctg} x}{x} = 0 \; (\text{omezená} \cdot \text{mizející})$$

$$\lim_{x\to\infty} \overbrace{\arcsin \frac{1-x}{1+x}}^{f(x)} = \arcsin(-1)^{+} = \arcsin(-1) = -\frac{\pi}{2}$$

$$\lim_{x\to\infty} \frac{1-x}{1+x} = \frac{x\left(\frac{1}{x}-1\right)}{x\left(\frac{1}{x}+1\right)} = -1 \qquad \left(\tfrac{1}{x}\to 0\right)$$

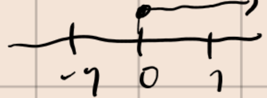
$D(f)$: $x \neq -1$

$$-1 \leq \frac{1-x}{1+x} \leq 1$$

$$\left|\frac{1-x}{1+x}\right| \leq 1$$

$$\frac{|1-x|}{|1+x|} \leq 1$$

$$|1-x| \leq |1+x|$$



$$D(f) = [0, \infty)$$

$$\lim \arcsin \frac{1-x}{\ldots} = \arcsin(-1)^{-} = \text{neho}\ldots$$

$\lim\limits_{x \to -\infty} \arcsin \frac{\dots}{1+x} = \arcsin(-1) \dots$

<u>DÚ:</u>

$$\lim_{x \to 1} \frac{1}{\sqrt{1-x^2}}$$

Def. obor fce. a limity v jeho hran. bodech:

$$f(x) = \coth(x) = \frac{\sinh(x)}{\cosh(x)} = \frac{\frac{e^x + e^{-x}}{2}}{\frac{e^x - e^{-x}}{2}} = \frac{e^x + e^{-x}}{e^x - e^{-x}}$$

$D(f) = e^x \neq e^{-x}$

$x \neq -x$

$x \neq 0$

$D(f) = (-\infty, 0) \cup (0, \infty)$

$$\lim_{x \to \infty} \frac{e^x + e^{-x}}{e^x - e^{-x}} = \left| \frac{\infty + 0}{\infty - 0} \right| = \left| \frac{\infty}{\infty} (\text{nedef.}) \right| = \lim_{x \to \infty} \frac{e^x (1 + \overset{\to 0}{e^{-2x}})}{e^x (1 - \underset{\to 0}{e^{-2x}})} = \frac{1+0}{1-0} = 1$$

$$\lim_{x \to -\infty} \frac{e^x + e^{-x}}{e^x - e^{-x}} = \left| \frac{\infty}{-\infty} \right| = \lim_{x \to -\infty} \frac{e^{-x} (\overset{\to 0}{e^{2x}} + 1)}{e^{-x} (\underset{\to 0}{e^{2x}} - 1)} = -1$$

$$\lim_{x \to 0} \frac{e^x + e^{-x}}{e^x - e^{-x}} = \left| \frac{2}{0} \right| = \text{neex.}$$

$$\lim_{x \to 0^+} \frac{e^x + e^{-x}}{e^x + e^{-x}} = \infty$$

$$\lim_{x \to 0^-} \frac{e^x + e^{-x}}{e^x + e^{-x}} = \left| \frac{2}{0^-} \right| = -\infty$$

$$f(x) = \left(\frac{x+1}{x-1}\right)^{\frac{1}{x-3}} = e^{\frac{1}{x-3} \ln\left(\frac{x+1}{x-1}\right)}$$

$D(f)$: $x \neq 1$

$x \neq 3$

$$\frac{x+1}{x-1} \geq 1$$

$$D(f) = (-\infty; -1) \cup (1; 3) \cup (3, \infty)$$