



## 5. minitest MA1

Varianta B

6. 12. 2024

Vypočtěte limitu funkce.

$$\lim_{x \rightarrow 0} \frac{\sqrt{\cos x} - 1}{x - x e^{\sin \frac{x}{2}}}$$

$$\lim_{x \rightarrow 0} \frac{\sqrt{\cos x} - 1}{x - x e^{\sin \frac{x}{2}}} \cdot \frac{\sqrt{\cos x} + 1}{\sqrt{\cos x} + 1} \stackrel{\text{VOAL}}{=} \lim_{x \rightarrow 0} \frac{1}{\sqrt{\cos x} + 1} \cdot \lim_{x \rightarrow 0} \frac{\cos x - 1}{x(1 - e^{\sin \frac{x}{2}})}$$

$$\stackrel{\text{VOAL}}{=} \frac{1}{2} \cdot \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} \cdot \lim_{x \rightarrow 0} \frac{x^2}{x(e^{\sin \frac{x}{2}} - 1)} =$$

$$= \frac{1}{2} \cdot \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} \cdot \lim_{x \rightarrow 0} \frac{x}{e^{\sin \frac{x}{2}} - 1} \cdot \lim_{x \rightarrow 0} \frac{x}{x} =$$

$$\stackrel{\text{VOAL}}{=} \frac{1}{4} \cdot 2 \lim_{x \rightarrow 0} \frac{\frac{x}{2}}{\sin \frac{x}{2}} \cdot \lim_{x \rightarrow 0} \frac{1}{\frac{e^{\sin \frac{x}{2}} - 1}{\sin \frac{x}{2}}} = \frac{1}{2}$$

$\underbrace{\lim_{x \rightarrow 0} \frac{\frac{x}{2}}{\sin \frac{x}{2}}}_{\text{VOLRF } 1} \cdot \underbrace{\lim_{x \rightarrow 0} \frac{1}{\frac{e^{\sin \frac{x}{2}} - 1}{\sin \frac{x}{2}}}}_{\text{VOLRF } 1} = \frac{1}{2}$