



Neodređeni oblici – L'Hospitalovo pravilo

I. slučaj $\frac{0}{0}$

1. $\lim_{x \rightarrow 0} \frac{x \cdot e^{\cos x}}{e^x - e^{-x}} \quad \left[= \frac{e}{2} \right]$

2. $\lim_{x \rightarrow 0} \frac{1 - \sin x - \cos x}{1 - x - \ln(e - x)} \quad \left[= \frac{e}{e^{-1}} \right]$

3. $\lim_{x \rightarrow 0} \frac{x - \sin x}{e^x - e^{\sin x}} \quad [= 1]$

4. $\lim_{x \rightarrow 0} \frac{x^3}{\sin x - x \cdot \cos x} \quad [= 3]$

5. $\lim_{x \rightarrow 0} \frac{\sin 2x - 2 \sin x}{x \cdot e^x - x - x^2} \quad [= 2]$

6. $\lim_{x \rightarrow 0} \frac{x - \sin x}{x^3 \cdot \cos x} \quad \left[= \frac{1}{6} \right]$

7. $\lim_{x \rightarrow 0} \frac{x^3}{\sin x - x} \quad [= 6]$

8. $\lim_{x \rightarrow 0} \frac{x - \sin x}{\sin x - x \cdot \cos x} \quad \left[= \frac{1}{2} \right]$

9. $\lim_{x \rightarrow 0} \frac{x^2}{\ln \cos x} \quad [= -2]$

10. $\lim_{x \rightarrow 1} \frac{\ln(x + \sqrt{x^2 - 1})}{\sqrt{x^2 - 1}} \quad [= 1]$

11. $\lim_{x \rightarrow 1} \frac{\arcsin \sqrt{1 - x^2}}{\sqrt{1 - x^2}} \quad [= 1]$

12. $\lim_{x \rightarrow a} \frac{\ln(x^2 - a^2 + 1)}{2x^2 - ax - a^2} \quad \left[= \frac{2}{3} \right]$



$$13. \quad \lim_{x \rightarrow \arctan 2} \frac{\tan^2 x - 3 \tan x + 2}{\tan^2 x - 5 \tan x + 6} \quad [= 1]$$

II. slučaj $\frac{\infty}{\infty}$

$$1. \quad \lim_{x \rightarrow \infty} \frac{\ln(2x+3)}{5x+2} \quad [= 0]$$

$$2. \quad \lim_{x \rightarrow \infty} \frac{\ln(3e^x - 2)}{5x+3} \quad \left[= \frac{1}{5} \right]$$

$$3. \quad \lim_{x \rightarrow \infty} \frac{x^2}{x + e^x} \quad [= 0]$$

$$4. \quad \lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan 3x}{\tan x} \quad \left[= \frac{1}{3} \right]$$

$$5. \quad \lim_{x \rightarrow 0} \frac{\frac{\pi}{x}}{\operatorname{ctg} \frac{\pi x}{2}} \quad \left[= \frac{\pi^2}{2} \right]$$

$$6. \quad \lim_{x \rightarrow 0} \frac{\operatorname{ctg} x}{1 + \frac{1}{x}} \quad [= 1]$$

$$7. \quad \lim_{x \rightarrow \infty} \frac{\ln(4e^x + 3)}{\ln(3e^x + 5)} \quad [= 1]$$

$$8. \quad \lim_{x \rightarrow 0} \frac{\ln \sqrt{\sin 5x}}{\ln x} \quad \left[= \frac{1}{2} \right]$$

$$9. \quad \lim_{x \rightarrow 0} \frac{\ln \tan 3x}{\ln \operatorname{ctg} 4x} \quad [= -1]$$



III. slučaj $0 \cdot \infty$

1. $\lim_{x \rightarrow 0} x^2 e^{-x} \quad [= 0]$

2. $\lim_{x \rightarrow 1} (1-x) \operatorname{tg} \frac{\pi x}{2} \quad \left[= \frac{2}{\pi} \right]$

3. $\lim_{x \rightarrow 0} x \cdot \ln x \quad [= 0]$

4. $\lim_{x \rightarrow a} (a-x) \operatorname{tg} \frac{\pi x}{2a} \quad \left[= \frac{2a}{\pi} \right]$

5. $\lim_{x \rightarrow \frac{\pi}{2}} (1-\sin x) \operatorname{tg}^2 x \quad \left[= \frac{1}{2} \right]$

6. $\lim_{x \rightarrow \infty} x \cdot \ln x \left(1 + \sin \frac{a}{x}\right) \quad [= a]$

7. $\lim_{x \rightarrow \frac{1}{2}} \arcsin(2x-1) \cdot \operatorname{ctg} \left(x - \frac{1}{2}\right) \quad [= 2]$

8. $\lim_{x \rightarrow \infty} x \left(e^{\frac{a}{x}} - 1\right) \quad [= a]$

9. $\lim_{x \rightarrow 0} \arcsin \frac{x}{a} \cdot \operatorname{ctg} \frac{x}{b} \quad \left[= \frac{b}{a} \right]$

IV. slučaj $\infty - \infty$

1. $\lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{1}{\ln x} \right) \quad \left[= -\frac{1}{2} \right]$

2. $\lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{x}{\operatorname{ctg} x} - \frac{\pi}{2 \cos x} \right) \quad [= -1]$

3. $\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{\sin x} \right) \quad [= 0]$



4. $\lim_{x \rightarrow \frac{\pi}{2}-0} \left(\frac{1}{\cos x} - \frac{1}{1 - \sin x} \right)$ $[= -\infty]$

5. $\lim_{x \rightarrow \frac{\pi}{2}} (\operatorname{tg} x - \sec x)$ $[= 0]$

6. $\lim_{x \rightarrow 1} \left(\frac{3a}{1-x^3} - \frac{a}{1-x} \right)$ $[= a]$

7. $\lim_{x \rightarrow 0} \left(\frac{1}{\sin x} + \frac{1}{\ln(1-x)} \right)$ $\left[= \frac{1}{2} \right]$

8. $\lim_{x \rightarrow 0} \left(\frac{1}{\sin^2 x} - \frac{1}{x \cdot \sin x} \right)$ $\left[= \frac{1}{6} \right]$

9. $\lim_{x \rightarrow 0} \left(\frac{1}{x^2} - \frac{\cos x}{x \cdot \sin x} \right)$ $\left[= \frac{1}{3} \right]$

10. $\lim_{x \rightarrow 0} \left(\frac{1}{x^2} - \operatorname{ctg} x \right)$ $\left[= \frac{2}{3} \right]$

V. slučaj 1^∞

1. $\lim_{x \rightarrow 0} (\cos x)^{\frac{1}{x}}$ $[= 1]$

2. $\lim_{x \rightarrow 0} \left(1 + \frac{x}{2} \right)^{\frac{1}{x}}$ $\left[= \sqrt{e} \right]$

3. $\lim_{x \rightarrow 0} (1 + \sin x)^{\frac{1}{x}}$ $[= e]$

4. $\lim_{x \rightarrow 0} \left(\frac{a^x + b^x}{2} \right)^{\frac{1}{x}}$ $\left[= \sqrt{ab} \right]$

5. $\lim_{x \rightarrow \frac{\pi}{2}} (\sin x)^{\frac{1}{\cos x}}$ $[= 1]$

6. $\lim_{x \rightarrow \frac{\pi}{2}} (\sin x)^{\operatorname{tg} x}$ $[= 1]$



7. $\lim_{x \rightarrow 0} (x + e^x)^{\frac{1}{x}}$ $[= e^2]$

8. $\lim_{x \rightarrow a} \left(2 - \frac{x}{a}\right)^{\frac{\pi x}{2a}}$ $\left[= e^{\frac{2}{\pi}}\right]$

VI. slučaj 0^0

1. $\lim_{x \rightarrow 0} x^x$ $[= 1]$

2. $\lim_{x \rightarrow 0} (1 + e^x)^{\frac{1}{n x}}$ $[= e]$

3. $\lim_{x \rightarrow 0} x^{\sin x}$ $[= 1]$

4. $\lim_{x \rightarrow 0} (\operatorname{tg} x)^{\frac{1}{\ln x}}$ $\left[= \frac{1}{e}\right]$

5. $\lim_{x \rightarrow 0} x^{\frac{1}{\ln(1-e^x)}}$ $[= e]$

VII. slučaj ∞^0

1. $\lim_{x \rightarrow \infty} \sqrt[n]{x}$ $[= 1]$

2. $\lim_{x \rightarrow 0} (\operatorname{ctg} x)^{\frac{2}{\ln x}}$ $[= e^2]$

3. $\lim_{x \rightarrow 0} \left(\frac{1}{x}\right)^{\operatorname{tg} x}$ $[= 1]$

4. $\lim_{x \rightarrow 0} \left(\frac{1}{e^x - 1}\right)^{\frac{1}{\ln x}}$ $\left[= \frac{1}{e}\right]$

5. $\lim_{x \rightarrow 0} \left(\frac{1}{\sin x}\right)^x$ $[= 1]$