

CORSO DI ANALISI MATEMATICA 1 - CDL TRIENNALE IN INGEGNERIA
A.A. 2025-26
ESERCIZI DEL 18/11/25

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1. LIMITI DI SUCCESSIONI E FUNZIONI

1.1. Calcolare i limiti seguenti:

- (a) $\lim_{x \rightarrow +\infty} \frac{1}{\sqrt{x^2 + 1}} \tan \left(\frac{\pi x}{2x + 1} \right);$
- (b) $\lim_{n \rightarrow +\infty} \frac{n^{n+1} - (2+n)^{n^2}}{(2+n^2)^n - n^{n^2+2}};$
- (c) $\lim_{n \rightarrow +\infty} \sqrt{n+1} \frac{(n^2+1)^{1/n} - 5(\log n) \arcsin \left(\frac{1}{n+2} \right) - 1}{\sqrt{n+3} \log n - \sqrt{n} \cos \frac{1}{n}};$
- (d) $\lim_{n \rightarrow +\infty} \frac{(\sqrt[n]{3} - 1) \log^2 n - e^{\frac{1}{n+2} \log^2(n+3)} \cos \frac{1}{\sqrt{n}} + 1}{(\sqrt[n]{n} - 1) \log n};$
- (e) $\lim_{x \rightarrow +\infty} \frac{\sin(\tan \frac{1}{x^5+5}) \sqrt{\arctan \frac{x+2}{x^2-3}} - \sinh(\frac{x^{5/3}+x}{x^2+x^{13/6}}) \log(\log(\sinh x)) - 1}{\sqrt[4]{e^{\frac{1}{x^2-1}} - 1} \log(x^5 - x^2)};$
- (f) $\lim_{n \rightarrow +\infty} \frac{(n! + n^n)[(n^2 - \arctan n)^3 - n^2]^{-2/9} - 1}{\log(27n)[e^{\frac{1}{n^4}} - \cos(\frac{\sin n - n}{\log^2(1+\sinh n)})]^{1/6}}.$