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Quaderni di Analisi Matematica – 2016

Matematica Open Source

$$\frac{d}{dx}f\left(x\right) \quad \sum_{k=0}^{+\infty}a_k \quad \int f\left(x\right)dx \quad \oint_{\Gamma}\left(X\,dx+Y\,dy+Z\,dz\right)$$

Esempio di limite di funzione trigonometrica

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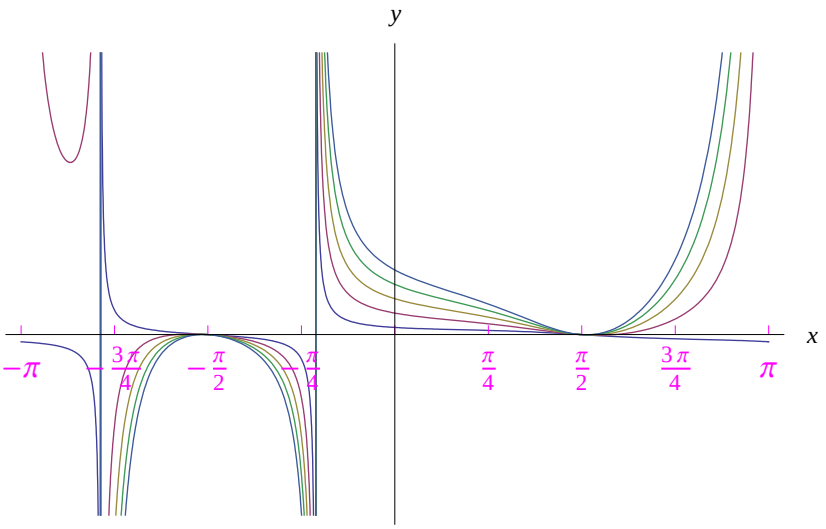

Esercizio 1 *Dimostrare*

$$\lim_{x\to 0} \frac{(\lambda-1)\,x+\tan x}{\sin x+\tan^2 x}=\lambda, \quad \forall\lambda\in\mathbb{R}$$

Soluzione.
Il rapporto si presenta nella forma indeterminata $\frac{0}{0}$. Scriviamo:

$$\begin{aligned}
\lambda &= \lim_{x\to 0} \frac{(\lambda-1)\,x+\frac{\sin x}{\cos x}}{\sin x+\frac{\sin^2 x}{\cos^2 x}} \\
&= \lim_{x\to 0} \frac{\sin x\left[(\lambda-1)\,\frac{x}{\sin x}+\frac{1}{\cos x}\right]}{\sin x\left(1+\frac{\sin x}{\cos^2 x}\right)} \\
&= \lim_{x\to 0} \frac{(\lambda-1)\,x+\frac{1}{\cos x}}{1+\frac{\sin x}{\cos^2 x}} = \\
&= \frac{\lambda-1+1}{1}=\lambda
\end{aligned}$$