$f(x) = \sum x e^{-n^4 x^2}$ $\overset{?}{\rightrightarrows}$

Weierstrass

$\sigma_n = \sup_{x \in \mathbb{R}} |f_n(x)|$

$f_n' = e^{-n^4x^2}(1-2x^2n^4)$

$x_0 = \pm \frac{\sqrt{2}}{2} \frac{1}{n^2}$

$\sigma_n = \frac{\sqrt{2}}{2} e^{-\frac{1}{2}} \frac{1}{n^2}$ $\quad \sum \sigma_n$ k. $\left(\text{LS}2 \ \frac{1}{n^2}\right)$

—

co když je sup v ∞?
kde z bodové

—

$f_n(x) = \sqrt{x^2 + \frac{1}{n}}$

$\lim_{n\to\infty} f_n = |x|$

$\lim_{n\to\infty} \sup_{x\in M} \left| \sqrt{x^2+1/n} - \sqrt{x^2} \right| = \lim \frac{1/n}{\sqrt{x^2+1/n}+\sqrt{x^2}} = 0$

tedy $f_n \rightrightarrows |x|$

—

zmizelo sup

—

$\sum (-1)^n \frac{n^3x}{1+n^4x^2}$ $\overset{?}{\rightrightarrows}$ na $\mathbb{R}$

- bodově z Leibnize
- Weierstrass

$\sigma_n = \sup_{x\in\mathbb{R}} \left| \frac{(-1)^n n^3 x}{1+n^4x^2} \right| = \frac{n}{2}$ pravda :)

ale $\sum \frac{n}{2}$ diverguje, tedy i pův $\sum$ div.

—

odůvodnit Leibn. i Weierstrass divergenci neumí!

$$f(x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n}}{n(2n-1)}$$

$$\rho = \frac{1}{\limsup \sqrt[n]{\frac{1}{n(2n-1)}}} = \dots = 1$$

$$f' = \sum_{n=1}^{\infty} \frac{(-1)^{n-1} x^{2n-1} \cdot 2}{2n-1}$$

—

chybí interval $x \in (-1,1)$, $a_n \neq \frac{1}{n(2n-1)}$

—

$x \in (-1,1)$

$$f(x) = \sum x^{n+1} \frac{n+3}{n+2} = \frac{1}{x} \underbrace{\sum x^{n+2} \frac{n+3}{n+2}}_{g}$$

$$g'(x) = \sum x^{n+1} (n+3)$$

—

$x \neq 0$

$$f(x) = \begin{cases} 0 & x \in (-\pi, 0) \\ x^2 & x \in [0, \pi] \end{cases}$$

$f \in BV((-\pi, \pi))$.

Tedy F_f konverguje z Jordan-Dirichlet kritéria k

$$g(x) = \begin{cases} f(x) & x \in (-k\pi, k\pi) \\ \frac{1}{2} & x = \pi + k\pi \quad k \in \mathbb{Z} \end{cases}$$

Spoj, $BV([-\pi, \pi])$, $= \frac{\pi^2}{2}$, $x = \pi + 2k\pi$

zdůvodnění

$$f = \begin{cases} \cos(2x) + 1 & x \in [-\pi/2, \pi/2] \\ 0 & x \in (-\pi, \pi/2) \cup (\pi/2, \pi) \end{cases}$$

f je spoj na $\mathbb{R}$, $f \in BV[-\pi, \pi]$, f je monotónní na $[-\pi, \pi]$

Pak $F_f \rightrightarrows$ na $\mathbb{R}$.

Lok. st., není monot.

$$f = \begin{cases} \cos(2x)+1) & x \in [-\frac{\pi}{2}, \frac{\pi}{2}] \\ 0 & x \in (-\pi, \pi/2) \cup (\pi/2, \pi) \end{cases}$$

$a_0 = 1 \qquad a_n = \frac{1}{\pi} \frac{2n \sin(n\frac{\pi}{2})}{4-n^2} \qquad b_n = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x)\cos(nx) \overset{2\times P.P}{=} \dots$

$$F_f = 1 + \sum_{n=1}^{\infty} \frac{1}{\pi} \frac{2n \sin(n\pi/2)}{4-n^2}$$

$b_n = 0$, $n = 2$?, $a_0 \to \frac{1}{2}$