Info

This note, that was found here, as a part of a collection
is written (completely with human hands) by Rupadarshi Ray,
was created on June 10, 2026 4:03:19 PM,
was last modified on September 7, 2026 1:11:04 PM, and
was exported on September 7, 2026 3:09:57 PM.

$\widehat{\ } : L^1[0,1] \to \mathcal{C}_0(\mathbb{Z}, \mathbb{C})$

- For $f \in L^1[0,1]$, the Fourier coefficients of f

$$\hat{f}(n) := \int_{x\in[0,1]} f(x)e^{-2\pi inx}$$

is bounded

$$\begin{aligned}\left|\hat{f}(n)\right| &\le \left|\int_{x\in[0,1]} f(x)e^{-2\pi inx}\right| \\ &\le \int_{x\in[0,1]} |f(x)| \\ &= \|f\|_1\end{aligned}$$

by its L^1-norm.

(Riemann-Lebesgue lemma for Fourier transform on S^1) Let $f \in L^1(S^1)$ then the Fourier coefficients $\hat{f}(k)$ converge to 0 in both $\mathbb{Z}$-directions

$$\hat{f}(k), \hat{f}(-k) \xrightarrow{k\to\infty} 0$$

That is

$$\widehat{\ } : L^1[0,1] \to \mathcal{C}_0(\mathbb{Z}, \mathbb{C})$$

Current note has 0 direct children and 0 total descendants.

- stem
  - subobjects of and functions on $\mathbb{R}^n, S^n, \mathbb{C}^n$ and its quotients $_\Gamma\backslash^{\mathbb{R}^n}, _\Gamma\backslash^{\mathbb{C}^n}$
    - Fourier
      - $\widehat{\ } : L^1[0,1] \to \mathcal{C}_0(\mathbb{Z}, \mathbb{C})$

And it has 10 siblings.

- stem
  - subobjects of and functions on $\mathbb{R}^n, S^n, \mathbb{C}^n$ and its quotients $_\Gamma\backslash^{\mathbb{R}^n}, _\Gamma\backslash^{\mathbb{C}^n}$
    - Fourier
      - Fourier transform on $L^2(-A, A) \le L^2(\mathbb{R})$
      - $\widehat{\ } : L^2(0,\infty) \cong_{\text{Hilb}} \mathscr{O}^2(H^2_{\mathbb{U}})$
      - Fourier transform on $\mathbb{R}^n$
      - Fourier transform on S^1, Fourier series on $[0,1]$
      - Functions on S^1 with absolutely converging Fourier series, $\check{l}^1(S^1)$
      - Fourier transform of distributions on S^1
      - $\widehat{\ } : L^1[0,1] \to \mathcal{C}_0(\mathbb{Z}, \mathbb{C})$
      - $\widehat{\ } : L^2[0,1] \cong_{\text{Hilb}} l^2(\mathbb{Z}, \mathbb{C})$
      - Fourier transform of measurable subsets
      - Unsharpness principles