Info

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Distributional derivatives

distributional derivatives of L^1_{loc} functions

Definition. Distributional derivatives of L^1_{loc} functions

Let $U(\text{open}) \subseteq \mathbb{R}^n$ be an open set and $f \in L^1_{\text{loc}}(U)$. Then $w \in L^1_{\text{loc}}$ is a **distributional derivative** of f in $\hat{x}_j$ direction

$$\overset{\int}{\partial}_j f = w \text{ if } \forall \varphi \in \mathcal{C}^\infty_c(U), \int_U w\varphi = -\int_U f\partial_j\varphi$$

Current note has 4 direct children and 4 total descendants.

- stem
  - subobjects of and functions on $\mathbb{R}^n, S^n, \mathbb{C}^n$ and its quotients $_\Gamma\backslash^{\mathbb{R}^n}, {}_\Gamma\backslash^{\mathbb{C}^n}$
    - Differentiable functions
      - Distributional derivatives
        - Fractional Sobolev spaces
        - $H^1(U)$
        - H^1_{loc}
        - $H^1_{\text{loc}}(U)$ for $U \subseteq \mathbb{R}^2$

And it has 10 siblings.

- stem
  - subobjects of and functions on $\mathbb{R}^n, S^n, \mathbb{C}^n$ and its quotients $_\Gamma\backslash^{\mathbb{R}^n}, {}_\Gamma\backslash^{\mathbb{C}^n}$
    - Differentiable functions
      - Functions $(a, b) \to \mathbb{R}$ differentiable at a point
      - Comparing a function and it derivative
      - Absolutely continuous functions on $[a, b]$ $\leftrightarrow \int_{[a,-]}(L^1[a, b])$
      - Distributional derivatives
      - Double derivative/Laplace operator on the circle
      - Fractional derivative
      - Infinite limit of derivatives
      - Space of continuous and continuously differentiable functions on $\mathbb{R}$
      - Derivative of maps $\mathbb{R}^n \to \mathbb{R}^m$
      - Zooming of a map $\mathbb{R}^n \to \mathbb{R}^m$