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Section:

8. Analysis

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On pseudofourier transforms

In [1] we introduced a concept of pseudofourier transforms using nonstandard analysis. We will show the definition without precise conditions. Let $f(x, y)$ be a complex valued function defined on $R \times R^+$. We define the pseudofourier transform $\mathcal{PF}(f, k)$, $k \in N$, of the function $f(x, y)$ by

$$\mathcal{PF}(f, k)(x, y) = \int_{-\infty}^{\infty} f(t, y) \exp(-y|t|^k) \exp(-ixt) dt.$$

Our main result is the following Theorem: $\mathcal{PF}(f, 1)(x, y) = \mathcal{F}(f)(x, y)$ a. e. $x \in R$, where $\mathcal{F}$ denotes the Fourier transform in the sense of the theory of hyperfunctions. In the case of $k = 2$, some results will be shown.

Reference[1] Y. Kuribayashi, The Fourier transforms using nonstandard analysis, Domestic Publication of RIMS Kyoto Univ., **957**(1996), 132-144.