for r, s). On the other hand, the first term on the right hand side of the identity (12), i.e. $z_0(t) = x_{a\varepsilon} * x_{a\varepsilon} * \ldots * x_{a\varepsilon}$ (k times) fulfils (again according to Lemma 1)

$$\frac{z_0(s) - z_0(r)}{s - r} = \frac{2\varepsilon^k t^{k-1}}{2^{2k-1}(k-1)!} \cdot \frac{2a}{5} + \varepsilon^k g_k(t, a)$$

where $g_k(t, a)$ is bounded as a function of a for any k, t. It is evident that if a is chosen sufficiently large then (8) holds and hence $x \in G_n^+$. The proof of (ii) for the sets G_n^- being quite analogous, we may consider the proof of Theorem 3 complete.

Remark. Let $\xi \in V$ (see Theorem 3). Take the set $V(\xi)$ of all functions from C with the following property: If $x_i \in V(\xi)$, $i = 1, 2, \ldots, k$, then the convolution $x_1 * x_2 * \ldots * x_k$ does not possess the derivative at any point $0 < t < 1$. It would be interesting to obtain some information on the structure of the sets $V(\xi)$ and their mutual relations. (If $\mathscr{V} = \bigcup_{\xi \in V} V(\xi)$, then evidently $V \subset \mathscr{V}$ and hence the complement of $\mathscr{V}$ in C is of the 1st category.)

References

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