Linear Oprator Between D[a, b] and A Banach Space E*

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Let g(t) denote an element of D[a, b] which is the space of all functions having discontinuities of the first kind.

Theorem 1. Every linear continuous oprator T from E to D[a, b] may be expressed by an abstract functionft Whose Values lie in E* and Which is Weakly quasicontinuous, and $\| T \| = \sup\limits_{t \in [a,b]} \| f_t \|$.

Theorem 2. Every linear completely continuous oprator T from E to D[a, b] may be expressed by an abstract function ft Whose Values lie in E* and Which is strongly quasicontinuous, and $\| T \| = \sup\limits_{t \in [a,b]} \| f_t \|$.

Theorem 3. Every linear Continuous oprator T from D[a, b] to E may be expressed in the form

$$T(g) = \int_b^a g(t)\,d f_t + \sum_{\substack{i=0 \\ b_i > a}}^{\infty} g(b_i - 0)(\psi_{b_i} - \psi_{b_i - 0}) + \sum_{\substack{i=0 \\ b_i < b}}^{\infty} g(b_i + 0)(\psi_{b_i + 0} - \psi_{b_i})$$

$$+ \sum_{\substack{i=0 \\ c_i > a}}^{\infty} [g(c_i) - g(c_i - 0)]\phi_{c_i},$$

Where $\{c_i\}$ denote the points of discontinuity of g(t), ft, ψ_t and ϕ_t depened only on T and are such that $f_t + \psi_t \in V_E[a, b]$ which is the space of all functions with bounded variation in E, $f_t \in VC_E[a, b]$ which is the space of all continuous functions in $V_E[a, b]$, ψ_t whose points of discontinuity is $\{b_i\}$ is the jump function of $f_t + \psi_t$ and ϕ_t vanishes except at a denumerable set of points and the sum of the absolute values of $\phi(x)$ at these points is finite.

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