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ON APPROXIMATE SOLUTIONS TO THE CONVOLUTION EQUATION ON THE HALF-LINE

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Communicated by R. C. Buck, July 24, 1963

1. We will call a complex-valued function on the half-line $t>0$ locally integrable if it is integrable on each interval $[0, T]$, $T>0$. Let $\mathcal{L}$ be the ring of locally integrable functions (functions which are equal up to a set of measure zero will be identified with each other) with the usual pointwise addition, and with convolution for the product operation. Thus $kx=r$ if and only if $\int_0^t k(t-u)x(u)du=r(t)$ for almost every $t>0$. Give $\mathcal{L}$ the topology defined by the seminorms $\|x\|_T=\int_0^T|x|(u)du$, $T>0$. Thus a sequence x_n, $n=1, 2, \cdots$ in $\mathcal{L}$ converges to 0 in $\mathcal{L}$ if and only if $x_n \to 0$ in $L[0, T]$ for each $T>0$ as $n\to\infty$. The equation $kx=r$ is an important integral equation; however, solutions and the existence of solutions are in general difficult to obtain. M. I. Fenyö and C. Foias [1][1] have shown that if k and r are in $\mathcal{L}$ and if k vanishes on no neighborhood of the origin (i.e. $\|k\|_T>0$ for each $T>0$) there is always an approximate solution to the equation

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[1] The author thanks the referee for calling this article to his attention.