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A SURVEY OF RESULTS INVOLVING TRANSFORMS AND CONVOLUTIONS IN FUNCTION SPACE

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ABSTRACT. In this paper we survey various results involving Fourier-Wiener transforms, Fourier-Feynman transforms, integral transforms and convolution products of functionals over function space that have been established since Cameron and Martin first introduced Fourier-Wiener transforms in 1945.

1. Introduction. In a 1945 paper [**7**], Cameron defined a *transform* of a function which was somewhat analogous to the *Fourier transform* of a function. Since then, many results based on (or inspired by) this definition have appeared in the literature. In fact, research based on this definition is continuing at the present time; more than 55 years later. Our goal in this survey article is to discuss those results, of which we are aware, whose roots can be traced back to the pioneering work of Cameron and Martin [**7**–**10**].

Let $C_0[0,T]$ denote one-parameter Wiener space; that is, the space of $\mathbf{R}$-valued continuous functions $x(t)$ on $[0,T]$ with $x(0)=0$. Let $\mathcal{M}$ denote the class of all Wiener measurable subsets of $C_0[0,T]$, and let m denote Wiener measure. $(C_0[0,T],\mathcal{M},m)$ is a complete measure space, and we denote the Wiener integral of a Wiener integrable functional F by

$$E[F]=E_x[F(x)]=\int_{C_0[0,T]}F(x)m(dx).$$

Let $L_2(C_0[0,T])$ be the space of $\mathbf{C}$-valued functionals F satisfying

$$\int_{C_0[0,T]}|F(x)|^2m(dx)<\infty.$$

Let $K=K_0[0,T]$ be the space of all $\mathbf{C}$-valued continuous functions defined on $[0,T]$ which vanish at $t=0$.

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