ROCKY MOUNTAIN
JOURNAL OF MATHEMATICS
Volume 30, Number 3, Fall 2000

ANALYTIC FOURIER-FEYNMAN TRANSFORM AND CONVOLUTION OF FUNCTIONALS ON ABSTRACT WIENER SPACE

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ABSTRACT. Huffman, Park and Skoug obtained various results for the L_p analytic Fourier-Feynman transform and the convolution of functionals in some Banach algebra $\mathcal{S}$ on classical Wiener space. Recently, Ahn studied L_1 analytic Fourier-Feynman transform theory for functionals in the Fresnel class $\mathcal{F}(B)$ of abstract Wiener space (B, ν).

In this paper we first define an L_p analytic Fourier-Feynman transform and a convolution of functionals on a product abstract Wiener space and establish various relationships between the Fourier-Feynman transform and convolution for functionals in the generalized Fresnel class $\mathcal{F}_{A_1,A_2}$ containing $\mathcal{F}(B)$. Also we obtain Parseval's relation for those functionals. Results of Huffman, Park, Skoug and Ahn are corollaries of our results.

1. Introduction. The concept of an L_1 analytic Fourier-Feynman transform for functionals on classical Wiener space was introduced by Brue in [**3**]. In [**4**], Cameron and Storvick introduced an L_2 analytic Fourier-Feynman transform on classical Wiener space. In [**11**], Johnson and Skoug developed an L_p analytic Fourier-Feynman transform theory for $1 \leq p \leq 2$ that extended the results in [**3**], [**4**] and gave various relationships between the L_1 and L_2 theories. In [**8**] Huffman, Park and Skoug defined a convolution product for functionals on classical Wiener space, and they obtained various results for the Fourier-Feynman transform and the convolution product [**8**], [**9**], [**10**]. Moreover, Chang, Kim and Yoo [**6**] introduced the integral transform which is an extension of Fourier-Wiener transform on the abstract Wiener space, and they established the relationship between the integral transform of functionals in some classes and the integral transform of their convolution.

Received by the editors on April 13, 1999, and in revised form on July 24, 1999.
1991 AMS *Mathematics Subject Classification.* 28C20.
Key words and phrases. Abstract Wiener space, Fourier-Feynman transform, convolution, Fresnel class.