ROCKY MOUNTAIN
JOURNAL OF MATHEMATICS
Volume 30, Number 2, Summer 2000

TRANSLATION THEOREMS FOR FOURIER-FEYNMAN TRANSFORMS AND CONDITIONAL FOURIER-FEYNMAN TRANSFORMS

SEUNG JUN CHANG, CHULL PARK AND DAVID SKOUG

1. Introduction. Translation theorems for Wiener integrals were given by Cameron and Martin in [**3**] and by Cameron and Graves in [**2**]. Translation theorems for analytic Feynman integrals were given by Cameron and Storvick in [**4**], [**7**] and translation theorems for Feynman integrals on abstract Wiener and Hilbert spaces were given by Chung and Kang in [**12**].

The concept of an L_1 analytic Fourier-Feynman transform (FFT) was introduced by Brue in [**1**]. In [**5**], Cameron and Storvick introduced an L_2 FFT. In [**20**], Johnson and Skoug developed an L_p FFT for $1 \le p \le 2$ which extended the results in [**1**], [**5**] and gave various relationships between the L_1 and L_2 theories. In [**15**]–[**17**], Huffman, Park and Skoug obtained various results involving the FFT and the convolution product, and in [**18**] used the concept of the (generalized) Feynman integral [**13**], [**24**] to define a (generalized) FFT (GFFT) and a generalized convolution product. Very recently [**26**], Park and Skoug studied (generalized) conditional FFT's (GCFFT's) and conditional convolution products.

In this paper we establish translation theorems for GFFT's and GCFFT's. In Section 3 we establish a translation theorem for the GFFT of very general functionals F defined on Wiener space $C_0[0,T]$, and in Section 4 we obtain a general translation theorem for GCFFT's. We then proceed to show that these general translation theorems apply to two well-known classes of functionals; namely, the Banach algebra $\mathcal{S}$ introduced by Cameron and Storvick in [**6**], and the space $\mathcal{B}_n^{(p)}$ consisting of functionals of the form

$$F(x) = f(\langle \alpha_1, x\rangle, \dots , \langle \alpha_n, x\rangle)$$

Received by the editors on December 16, 1998.
The first author was supported by KOSEF post-doctoral fellowship in Korea in 1997.