

## BANACH ALGEBRA OF YEH-FEYNMAN INTEGRABLE FUNCTIONALS

JOO SUP CHANG

This thesis consists of three parts, the first two parts concern with the evaluation of some conditional Wiener integrals and the conditional Yeh-Wiener integral, respectively, and the last part deals with a Banach algebra of Yeh-Feynman integrable functionals.

Let  $T=[0, t]$  and let  $(C(T), \mathcal{O}, m_w)$  be the Wiener measure space. J. Yeh has recently introduced the concept of the conditional Wiener integrals  $E^W(Z|X)$  on  $\mathbf{R}^1$  of a real-valued Wiener integrable functional  $Z$  conditioned by the Wiener measurable functional  $X$  on Wiener space. And he evaluated some conditional Wiener integrals  $E^w(Z|X)$  conditioned by  $X(x)=x(t)$  for  $x$  in Wiener space using the inversion formulae for the conditional Wiener integrals.

In Chapter 1, we define the conditional Wiener integral  $E^w(Z|X)$  on  $\mathbf{R}^n$  for the random vector  $X$  given by  $X(x)=(x(s_1), \dots, x(s_n))$  where  $0=s_0 < s_1 < \dots < s_n=t$  and  $x$  in Wiener space. And we evaluate the conditional Wiener integral  $E^w(Z|X)$  for this random vector  $X$ .

Let  $(C_2(Q), \mathcal{Y}, m_y)$  be the Yeh-Wiener measure space where  $Q=[0, s] \times [0, t]$ . Recently K. S. Chang, D. M. Chung, and J. M. Ahn extended Yeh's results for the conditional Wiener integrals to the conditional Yeh-Wiener integrals. In Chapter 2, we evaluate the conditional Yeh-Wiener integral of  $\exp\{-\int_0^t \int_0^s V[x(u, v)] dudv\}$  given  $x(s, t)$  where  $x$  is in  $C_2(Q)$  and  $V$  is a nonnegative continuous function on  $\mathbf{R}^1$  satisfying the condition

$$\int_{\mathbf{R}^1} V(\xi) \exp\left\{-\frac{\xi^2}{2st}\right\} d\xi < \infty.$$

Cameron and Storvick has recently treated a Banach algebra of functionals on Wiener space. For such functionals they show that the analytic Feynman integral, defined by analytic continuation of the Wiener integral, exists, and they give a formula for this Feynman integral.

In Chapter 3, we define the analytic Yeh-Feynman integral for functionals on Yeh-Wiener space and deal with a Banach algebra of Yeh-Feynman integrable functionals. And we have formulae for these Yeh-Feynman integrals. Finally

some results for the analytic Feynman integrals can be extended to the analytic Yeh-Feynman integrals.

Hanyang University  
Seoul 133, Korea