

Dmitriy F. Kuznetsov (Peter the Great St.-Petersburg Polytechnic University, St.-Petersburg, Russia). **New Representations of the Hu–Meyer Formulas for the Case of a Multidimensional Wiener Process.**

Theorem 1 [1] (P. 914, 918). *Let $\Phi(t_1, \dots, t_k) \in L_2([t, T]^k)$, $\{\phi_j(x)\}_{j=0}^\infty$ is an arbitrary CONS in $L_2[t, T]$, and condition [1] (P. 913) is fulfilled. Then for all $k \in \mathbf{N}$ and $i_1, \dots, i_k = 0, 1, \dots, m$*

$$J^S[\Phi]_{T,t}^{(i_1 \dots i_k)} = J'[\Phi]_{T,t}^{(i_1 \dots i_k)} + \sum_{r=1}^{[k/2]} \sum_{s=1}^r \prod_{s=1}^r \mathbf{1}_{\{i_{g_{2s-1}} = i_{g_{2s}} \neq 0\}} J' \left[T_{g_1, g_2, \dots, g_{2r-1}, g_{2r}}^{k-2r} \Phi \right]_{T,t}^{(i_{q_1} \dots i_{q_{k-2r}})} \quad w. p. 1.$$

If, in addition, the condition [1] (P. 917-918) is satisfied, then

$$J'[\Phi]_{T,t}^{(i_1 \dots i_k)} = J^S[\Phi]_{T,t}^{(i_1 \dots i_k)} + \sum_{r=1}^{[k/2]} (-1)^r \sum_{s=1}^r \prod_{s=1}^r \mathbf{1}_{\{i_{g_{2s-1}} = i_{g_{2s}} \neq 0\}} J^S \left[\tilde{T}_{g_1, g_2, \dots, g_{2r-1}, g_{2r}}^{k-2r} \Phi \right]_{T,t}^{(i_{q_1} \dots i_{q_{k-2r}})} \quad w. p. 1,$$

where $[x]$ is an integer part of x , $J^S[\Phi]_{T,t}^{(i_1 \dots i_k)}$ is the multiple Stratonovich integral [1] (P. 912), $J'[\Phi]_{T,t}^{(i_1 \dots i_k)}$ is the multiple Wiener integral [1] (P. 211), $T_{g_1, g_2, \dots, g_{2r-1}, g_{2r}}^{k-2r} \Phi$, $\tilde{T}_{g_1, g_2, \dots, g_{2r-1}, g_{2r}}^{k-2r} \Phi$ are r th limiting traces of Φ [1] (P. 911, 915), \sum' is the sum with respect to all permutations of the set $(\{\{g_1, g_2\}, \dots, \{g_{2r-1}, g_{2r}\}\}, \{q_1, \dots, q_{k-2r}\})$, $\{g_1, g_2, \dots, g_{2r-1}, g_{2r}, q_1, \dots, q_{k-2r}\} = \{1, 2, \dots, k\}$, $\{\cdot\}$ — unordered set, (\cdot) — ordered set, $\prod_\emptyset \stackrel{\text{def}}{=} 1$, $\sum_\emptyset \stackrel{\text{def}}{=} 0$, $\mathbf{1}_A$ is the indicator of A .

Theorem 1 presents analogues of Theorems 5.1, 6.1 from [2] for the case of a multidimensional Wiener process.

СПИСОК ЛИТЕРАТУРЫ

- [1] D.F. Kuznetsov, <https://arxiv.org/abs/2003.14184> (v75 — 2026).
- [2] Johnson, G.W., Kallianpur, G. Homogeneous chaos, p -forms, scaling and the Feynman integral. Trans. Amer. Math. Soc., 340 (1993), 503-548.