

Lecture on Stochastic and Infinite Dimensional Analysis

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Abstract

In the first part of this lecture we give a general mathematical background of Infinite dimensional Analysis:

- Topological vector spaces. Locally convex spaces. Duality theory.
- Tensor product of Hilbertian spaces. Operators on Fock spaces.
- Nuclear spaces. The Schwartz-Grothendieck kernel theorem.
- Introduction of infinite dimensional holomorphy.
- Bochner-Minlos theorem and Gaussian measures on nuclear spaces. Wiener abstract space.

In particular we focus on the theory of the white noise calculus:

- Construction of test and generalized white noise functionals.
- Chaotic Transform or the S transform of generalized white noise functionals.
- Wiener- Itô- Segal isomorphism.
- Characterization theorem via the S transform.

In the second part of this lecture we give some applications to this calculus:

- Solutions of the infinite dimensional heat equation.
- Infinite dimensional convolution calculus and Wick product.
- Quantum operators.
- Infinite dimensional evolution equation.