

A few references to the talk—unfortunately, as I am not really a specialist in this field, very incomplete. I first learned this from Irving Segal when I was a student, so some references will go back to him or his students.

1.) weak distributions / generalised processes
generalised random variables, measures on
infinite dimensional spaces

first two monographs

P Krée, C Soize: Mathematics of Random Phenomena
doi: 10.1007/978-94-009-4770-2
(Ch X and XI, they use the name linear process)

IM Gel'fand, N Vilenkin: Generalized functions Vol. 4
(Ch. III, they use the name generalized random process)

and a paper (he uses the name weak distribution):

L. Gross: Measurable functions on Hilbert space,
Transactions of the American Mathematical Society, 1962
doi: 10.2307/1993726
he gives more references to Segal's work

These references are good for a start on generalised random variables (beyond measurable functions), good background knowledge

T Hida, HH Kuo, J Potthoff, L Streit: White noise: an
infinite dimensional calculus
doi: 10.1007/978-94-017-3680-0

H Holden, B Øksendal, J Ubøe, T Zhang: Stochastic partial
differential equations
doi: 10.1007/978-1-4684-9215-6_4

On much of the things with Gaussian RVs, polynomial chaos etc.

S Janson: Gaussian Hilbert spaces
Cambridge U Press

Very compact, difficult to read

P Malliavin: Stochastic Analysis
doi: 10.1007/978-3-642-15074-6

plus further references in these.

2.) Algebra of random variables, non-commutative probability

First a textbook:

IE Segal, RA Kunze: Integrals and operators
doi: 10.1007/978-3-642-66693-3
(Ch VIII is the one which is relevant here, only the commutative case is completely worked out)

A survey paper by Segal himself

I Segal: Algebraic integration theory
doi: 10.1090/S0002-9904-1965-11284-8

Then a few pointers to Wikipedia. Big interest is in a version of non-commutative probability I did not mention much: free probability. There are plenty of references in these Wikipedia articles. This is in increasing order of abstraction.

https://en.wikipedia.org/wiki/Algebra_of_random_variables
https://en.wikipedia.org/wiki/Random_matrix
https://en.wikipedia.org/wiki/Free_probability
https://en.wikipedia.org/wiki/Noncommutative_geometry
[https://en.wikipedia.org/wiki/State_\(functional_analysis\)](https://en.wikipedia.org/wiki/State_(functional_analysis))
https://en.wikipedia.org/wiki/Non-commutative_conditional_expectation
https://en.wikipedia.org/wiki/Von_Neumann_algebra

Specifically about random matrices, Terence Tao's blog:

<https://terrytao.wordpress.com/2010/02/10/245a-notes-5-free-probability/>

and a monograph:

J Mingo, R Speicher: Free probability and random matrices
doi: 10.1007/978-1-4939-6942-5

And here a book on the application of random matrices and free probability to big data:

RC Qiu, P Antonik: Smart Grid using Big Data Analytics:
A Random Matrix Theory Approach, Wiley, 2017