RECOVERING MODELLED DISTRIBUTIONS FROM PARACONTROLLED CALCULUS

MASATO HOSHINO

Many singular SPDEs have motivations from statistical physics, quantum field theory, etc., but they are sometimes ill-posed without "renormalizations". The theory of *paracontrolled calculus* by Gubinelli, Imkeller and Perkowski made it possible to show the local well-posedness results for such renormalized SPDEs. Compared with the famous theory of *regularity structures* by Hairer, the PC theory has an advantage in showing detailed properties (global well-posedness, ergodicity, etc.) but it is not algebraically sophisticated. Our ultimate goal is to show the equivalence of RS and PC and construct a new theory which has both advantages of RS and PC.

One of the main differences between the two theories is in the definition of solutions. In PC, solutions are written by using the Bony's paraproduct. In RS, solutions are described based on local estimates. Therefore in order to get the relationship between these concepts, we need local estimates of Bony's paraproduct.

This talk consists of the following three steps.

(1) (Analytical step) We consider local behaviors of the nonlocal operators
$$(\dots((f^1 \circledcirc f^2) \circledcirc f^3)\dots \circledcirc f^{n-1}) \circledcirc f^n.$$
For the simplicity, we consider slightly simpler operators.

(2) (Algebraic step) We construct the Hopf algebra which represent the structure appearing in (1).

(3) Some applications: multiplicative SDEs with singular noises, iterated commutators, paralinearization, etc.

This talk is based on a joint work with Ismaël Bailleul.

Faculty of Mathematics, Kyushu University
E-mail address: hoshino@math.kyushu-u.ac.jp