"Applications of paracontrolled distributions"

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In this series of lectures I will review the use of paraproducts in the study of certain questions related to singular stochastic partial differential equations. Our main examples will be the study of the Anderson Hamiltonian in 2 dimensions, weak solution to SDEs with singular drift, the stochastic quantisation equation and the KPZ equation. Paraproducts provide a simple tool to resolve some singular phenomena in SPDEs and even if their scope is not as wide as Hairer's regularity structures they are as effective in the analysis of the above problems. If time permits I will discuss also the question of the weak-universality of the KPZ equation and the relation with regularity structures and with the renormalisation group.

Relevant literature

- M. Gubinelli, N. Perkowski. Lectures on Singular Stochastic PDEs.
  http://arxiv.org/abs/1502.00157
- M. Gubinelli, P. Imkeller, N. Perkowski. Paracontrolled distributions and singular PDEs.
  http://arxiv.org/abs/1210.2684
- Giuseppe Cannizzaro, Khalil Chouk. Multidimensional SDEs with singular drift and universal construction of the polymer measure with white noise potential.
  http://arxiv.org/abs/1501.04751
- Rémi Catellier, Khalil Chouk. Paracontrolled Distributions and the 3-dimensional Stochastic Quantization Equation.
  http://arxiv.org/abs/1310.6869
- Jean-Christophe Mourrat, Hendrik Weber. Global well-posedness of the dynamic $\phi 4$ model in the plane.
  http://arxiv.org/abs/1501.06191