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(University of Potsdam)  
Renormalisation from Quantum Field  
Theory to Random and Dynamical  
Systems**

**ZEIT:**

7.11.2013 - 9.11.2013

**ORT:**

Universität Potsdam  
Institut fuer Mathematik  
Am Neuen Palais 10  
14469 Potsdam

The meeting aims at investigating the uses of renormalisation techniques inspired from physics beyond their original field of application, namely beyond quantum field theory. The need to renormalise arises in many a field such as in the theory of random PDEs and dynamical systems and in various disguises. Solving PDEs with singular (typically random) input or local dynamical systems via a linearisation procedure, involves taking limits of regularised expressions modified by the addition of diverging counterterms in order to ensure a convergence. These counterterms arise naturally through the action of a "renormalisation group", a concept borrowed from quantum field theory. The work of Dirk Kreimer and Alain Connes who gave an algebraic reformulation in the context of Hopf algebras, of the forest formula used by physicists, provides algebraic tools to organise the counterterms by means of a Birkhoff-Hopf factorisation. This algebraic approach to issues of an a priori purely analytic nature was the source of inspiration for further developments on the tree structure underlying the combinatorics of Feynman diagrams. This meeting, which aims at providing an insight on the interaction between purely analytic renormalisation issues and the algebraic constructions used to approach

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them, is organised around the following topics:

Confirmed Speakers:

Viet Dang Nguyen, Paris VI □ Renormalised products of distributions which fail to satisfy the Hörmander condition

Loïc Foissy, Reims □ Algebraic and combinatorial aspects of quantum field theory

Massimiliano Gubinelli, Paris Dauphine □ Paracontrolled distributions

Peter Imkeller, H.U. Berlin □ A Fourier analytic approach to rough paths

Dominique Manchon, Clermont-Ferrand □ The double shuffle structure of the Ohno-Okuda-Zudilin  $q$ -multiple zeta values

Frédéric Menous, Paris XI, Orsay □ Renormalization and dynamical systems

Erik Panzer, H.U. Berlin □ Renormalization by kinematic subtraction and Hopf algebras

Nicolas Perkowski, H.U. Berlin □ Paracontrolled distributions and the parabolic Anderson model

Hendrik Weber, University of Warwick □ Non-linear SPDEs, controlled distributions and renormalisation

Participants are welcome to attend a COLLOQUIUM on topics related to those of the meeting.

Please register on line via the following link before Sept. 20th:

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