

# An introduction to Martin Hairer's concept of regularity structures

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The aim of this talk is to give an introduction into Martin Hairer's concept of regularity structures, for which he won the Field's Medal in 2014 and which gave rise to a novel theory for the solution of semilinear stochastic PDEs. Roughly speaking, the theory generalizes the concept of Taylor polynomials, which approximate regular functions very well, in such a way that also much more irregular functions or distributions can be described by simpler objects. The main part of this theory is the *Reconstruction Theorem*, which is a beautiful and surprising result from wavelet analysis and which describes, under which conditions one can obtain an actual distribution by gluing together a given collection of "Taylor expansions".

For further information, see for instance Hairer's main paper [1] or the concise overview [2].

## References

- [1] Martin Hairer. A theory of regularity structures. *Invent. Math.*, 198(2):269–504, 2014.
- [2] Martin Hairer. Introduction to regularity structures. *Braz. J. Probab. Stat.*, 29(2):175–210, 2015.