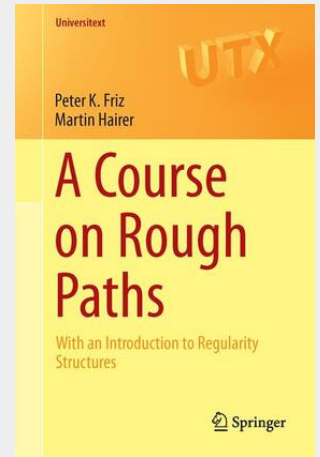


## A Course on Rough Paths

With an Introduction to Regularity Structures

Lyons' rough path analysis has provided new insights in the analysis of stochastic differential equations and stochastic partial differential equations, such as the KPZ equation. This textbook presents the first thorough and easily accessible introduction to rough path analysis. When applied to stochastic systems, rough path analysis provides a means to construct a pathwise solution theory which, in many respects, behaves much like the theory of deterministic differential equations and provides a clean break between analytical and probabilistic arguments. It provides a toolbox allowing to recover many classical results without using specific probabilistic properties such as predictability or the martingale property. The study of stochastic PDEs has recently led to a significant extension – the theory of regularity structures – and the last parts of this book are devoted to a gentle introduction. Most of this course is written as an essentially self-contained textbook, with an emphasis on ideas and short arguments, rather than pushing for the strongest possible statements. A typical reader will have been exposed to upper undergraduate analysis courses and has some interest in stochastic analysis. For a large part of the text, little more than Itô integration against Brownian motion is required as background.

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