Stochastic B–series with some applications

Anne Kværnø (Norwegian University of Science and Technology), Kristian Debrabant

B–series, series expansions in which each term is expressed in terms of rooted trees, is well known to be an indispensable tool for constructing and analyzing numerical schemes for time-dependent differential equations. But they have also attracted quite some interest by their own terms. In this talk, we will present a unified approach to the construction of B-series with application to stochastic differential equations (SDEs). The rather obvious use of such series, the construction of order conditions of numerical schemes, is well known. It is less known that by comparing stochastic B–series with the more familiar Wagner-Platen expansions, certain relations between different stochastic integrals are revealed. The use of B–series and growth functions to express iteration errors in implicit methods is another less conventional use of the series.
A few such aspects of stochastic B–series will be discussed in this talk.