The 20th Takagi Lectures

November 4 (Sat), 2017

Graduate School of Mathematical Sciences
The University of Tokyo, Tokyo, Japan

ABSTRACT

Martin Hairer:

Renormalisation of parabolic stochastic PDEs

We give a survey of recent result in probability theory regarding scaling limits of systems from statistical mechanics, as well as the universality of the behaviour of such systems in so-called cross-over regimes. It transpires that some of these universal objects are described by singular stochastic PDEs. We then give a survey of the recently developed theory of regularity structures which allows to build these objects and to describe some of their properties.

* * * * * * * * * *

Andrei Okounkov:

The Donaldson–Thomas theory of threefolds, or why is it interesting to count sheaves?

My goal in these two lectures is to explain:

1) what are the Donaldson-Thomas counts counting,
2) how are these counts related to other parts of mathematics and mathematical physics,
3) what are the elementary counts, from which all other ones could be, at least in principle, derived,
4) how are the elementary counts described using geometric representation theory.

As this is, realistically, too much ground to cover in two lectures, I will try to describe what I personally consider to be the most important points and ideas, hoping that those who are interested will open the accompanying notes.