## Statistical conservation laws for scalar model problems: From hierarchies to numerical approximations

Qian Huang, Christian Rohde\*

Institute of Applied Analysis and Numerical Simulation, University of Stuttgart, Stuttgart, 70569, Germany E-mail: qian.huang@mathematik.uni-stuttgart.de \*christian.rohde@mathematik.uni-stuttgart.de

The probability density functions (PDFs) for the solution of the incompressible Navier-Stokes equation can be represented by a hierarchy of linear equations. In this direction, we investigate a scalar conservation law with random initial data as a model problem, and derive new governing equations for PDFs. A viscosity-induced unclosed term enters this kinetic-type equation and plays a pivot role in preserving the positivity of PDFs. Numerical approximation of the unclosed term by samples from the underlying conservation laws will be discussed. This is our ongoing work under the project SPP 24-10.