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Fakultät für Mathematik

EINLADUNG

zum

HABILITATIONSVORTRAG

Paolo Giordano, PhD
(Wolfgang Pauli Institute)

“A Grothendieck topos of generalized functions”

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Abstract:
We present a new approach to generalized functions, so-called generalized smooth functions (GSF). GSF are set-theoretical maps defined on the non-Archimedean ring of Robinson-Colombeau; they form a category which unifies and extends Schwartz distributions and Colombeau generalized functions. The calculus of GSF is closely related to classical analysis, with point values, free composition and hence non linear operations. We have classical theorems such as: intermediate value theorem, mean value theorems, extreme value theorem, local and global inverse function theorems, generalized sheaf property; Multidimensional integration with convergence theorems; A theory of singular nonlinear ODE with Banach fixed point theorem, Picard-Lindelöf theorem and maximal set of existence; Several classical results of the calculus of variations. Using GSF, we can also prove a Picard-Lindelöf theorem for nonlinear singular PDE in normal form. Finally, we can define a concrete site and hence a Grothendieck topos of sheaves of GSF. This topos embed classical smooth manifolds and is closed with respect to products, sums, infinite-dimensional function spaces, arbitrary subspaces, etc.

Dienstag, 19. November 2019
11:30 Uhr – 12:15 Uhr

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