VORTRAGSANKÜNDIGUNG

Im Rahmen unseres gemeinsamen Oberseminars

„Numerische Mathematik, Optimierung und Dynamische Systeme"

und im Rahmen des

„Forschungszentrums für Modellierung und Simulation (MODUS)"

spricht

Herr **Prof. Dr. Joachim Krug**
Universität zu Köln, Institut für Theoretische Physik

am   **Montag, 03. Juli 2017,** 16 Uhr c. t. über das Thema

"Mathematical aspects of biological fitness landscapes"

Abstract:

Biological evolution can be conceptualized as a search process in the space of gene sequences guided by the fitness landscape, a mapping that assigns a measure of reproductive value to each genotype. The relationship between genotype and fitness is generally complex, as it is mediated by the multidimensional organismic phenotype that interacts with the environment and thereby determines reproductive success. Two modeling strategies have been devised to deal with this situation. One is to shortcut the intermediate phenotypic level by assigning fitness directly to genotypes. This leads to probabilistic models that define ensembles of random functions on Hamming spaces or (in the standard case of binary sequences) on the hypercube. An alternative and biologically more realistic approach is provided by Fisher's geometric model (FGM), which describes the phenotype as a vector in an n-dimensional Euclidean trait space with a unique fitness optimum. Genetic mutations are encoded as random phenotypic displacements, and complexity arises from the difficulty of optimizing a smooth function by a finite number of random vectors. After a historical introduction and an overview of the current understanding of real fitness landscapes that is available from empirical studies, I will survey quantitative measures of fitness landscape complexity and present the results of a recent analytical study of the fitness landscape generated by FGM.

Der Vortrag findet im S 80, Gebäude NW II statt.

gez. Lars Grüne