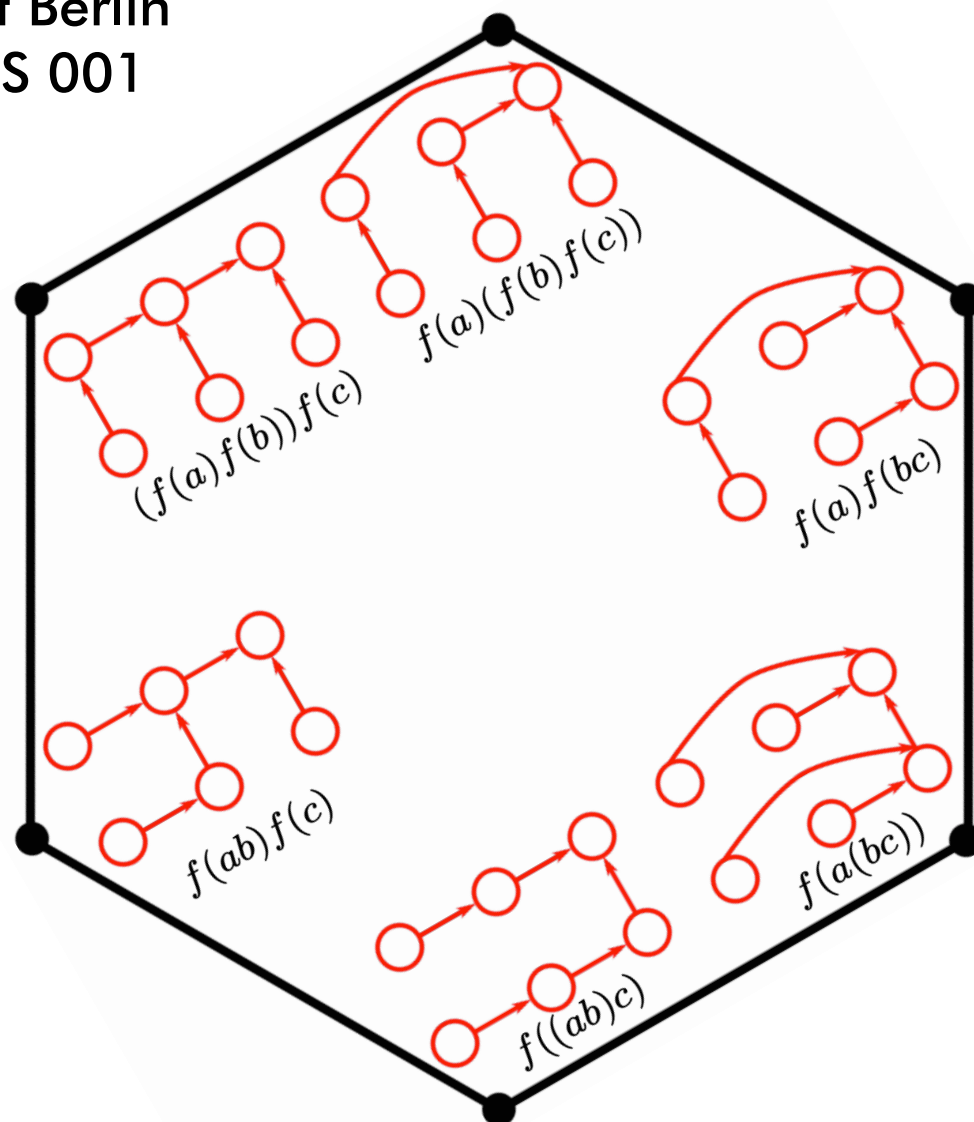


Mo., 19.6.2023
18:00 (s. t.)
Freie Universität Berlin
Arnimallee 3, HS 001



Prof. Raman Sanyal

From linear programming to colliding particles

The simplex algorithm is the method of choice for solving linear optimization problems in practice. However, it is a famous open problem to show that the simplex algorithm also performs well in theory. From a discrete-geometric perspective, the simplex algorithm follows a path in the graph of a convex polytope and the path is determined by a so-called pivot rule. The challenge is to find a pivot rule that always takes a “short” path. In recent work, we defined and studied a type of pivot rules that, for any given instance of a linear optimization

problem, yields a (polyhedral) space of pivot rules. While this has not (yet!) solved the running time problem, these spaces of pivot rules have provided us with new connections and perspectives to objects from completely different areas of math. In this talk I will explain how spaces of pivot rules on nearly-trivial linear programming instances give a new perspective on the not-so-trivial behavior of particles on lines on planes... All we will need is some linear algebra in the plane and combinatorics.