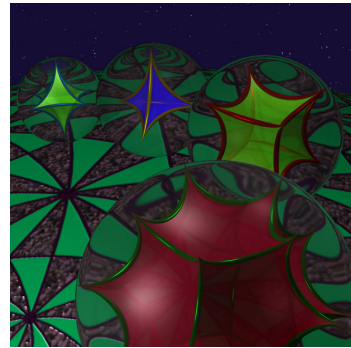


Oberseminar Geometrie
Department of Mathematics
University of Fribourg
Seminar room, Math II (Lonza)
Wednesday February 21, 2018, 10:20-12:00



CORINA CIOBOTARU (Fribourg)

Applications of hyperbolic geometry to Kuramoto model of synchronization

The Kuramoto model of synchronization is a mathematical model describing the phenomenon of self-synchronization in large systems of interacting oscillatory elements. Examples include synchronization of cardiac pacemaker cells, firefly populations, electro-chemical oscillations, synchronization of people walking, etc... Those phenomena are modelled via a system of ordinary differential equations (the Kuramoto model) and the solution to this o.d.e "converges" with time to an equilibrium point, the synchronisation of the system. Amazingly, the equilibrium point is linked to the hyperbolic geometry on the Poincaré disc model and the Moebius transformations.

By employing the four different models for the hyperbolic plane, in the recent joint work with Hoessly–Mazza–Richard, we unify and clarify various aspects of the Kuramoto model previously existed in the literature.