BOSPHORUS REAL GEOMETRY CONFERENCE

Istanbul Center for Mathematical Sciences

Saturday, October 12, 2019

10:00–11:00 **Susumu Tanabé**, *Monodromy of A-GKZ hypergeometric functions associated to Calabi-Yau hypersurfaces in a toric variety*.

11:00–11:30 Coffee break

11:30–12:30 **Ferit Öztürk**, *Real algebraic overtwisted contact structures on* S^3.

14:30–15:30 **Burak Özbağci**, *Complexifying versus convexifying a Morse function on a surface*.

Abstracts

Susumu Tanabé (Galatasaray University),
Monodromy of A-GKZ hypergeometric functions associated to Calabi-Yau hypersurfaces in a toric variety

Abstract. We study the monodromy of Gelfand-Kapranov-Zelevinski hypergeometric functions that are considered as periods of a Calabi-Yau hypersurface defined by a reflexive polytope. In other words we assume that this polytope gives rise to a reflexive Gorenstein cone. Our principal concern will be the monodromy behaviour of GKZ hypergeometric functions as they are analytically continued along loops avoiding discriminantal loci. We shall use the language of amoeba to describe the analytic continuation process. The main theorem states a monodromy formula that allows interpretation as a variation of Picard-Lefschetz formula in our special setting. In contrast to existing methods relying on homological cycles, we propose here a method to study the monodromy by means of cohomology ring.We show that in certain cases our main theorem gives supporting evidence for the homological mirror symmetry conjecture by Kontsevich.

Ferit Öztürk (Bogaziçi University),
Real algebraic overtwisted contact structures on S^3

Abstract. A complex algebraic function on $\mathbb{C}^2$ with an isolated singularity at the origin describes an open book on S^3. For any such open book, the corresponding contact structure is the unique tight one on S^3. Meanwhile one can obtain open books on S^3 via real algebraic functions with isolated singularities as well. We prove that infinitely many of the overtwisted structures on S^3 are obtained in that way. Moreover those are exactly all the planar, real algebraic ones possible. We discuss whether all the overtwisted structures on S^3 are real algebraic. This is a joint work with eyma Karadereli.

Burak Özbağci (Koç University),
Complexifying versus convexifying a Morse function on a surface

Abstract. We will review two constructions: (1) Lifting a Morse function on a smooth manifold to a symplecto-convex Morse function on its cotangent bundle (2) Lifting a Morse function on a smooth manifold to a contacto-convex Morse function on its unit contact cotangent bundle. In the case of smooth surface, we will compare these with the complexification of a Morse function.