

Department of Mathematics, BGU

Colloquium

On *Tuesday, December ,24 2019*

At *14:30 – 15:30*

In *Math 101-*

Adam Dor On (University of Copenhagen)

will talk about

Matrix convexity, Arveson boundaries and Tsirelson problems

Abstract: Following work of Evert, Helton, Klep and McCullough on free linear matrix inequality domains, we ask when a matrix convex set is the closed convex hull of its (absolute) extreme points. This is a finite-dimensional version of Arveson's non-commutative Krein-Milman theorem, which may generally fail completely since some matrix convex sets have no (absolute) extreme points. In this talk we will explain why the Arveson-Krein-Milman property for a given matrix convex set is difficult to determine. More precisely, we show that this property for certain commuting tensor products of matrix convex sets is equivalent to a weak version of Tsirelson's problem from quantum information. This weak variant of Tsirelson's problem was shown, by a combination of results of Kirchberg, Junge et. al., Fritz and Ozawa, to be equivalent to Connes' embedding conjecture; considered to be one of the most important open problems in operator algebras. We do more than just provide another equivalent formulation of

Connes' embedding conjecture. Our approach provides new matrix-geometric variants of weak Tsirelson type problems for pairs of convex polytopes, which may be easier to rule out than the original weak Tsirelson problem.

Based on joint work with Roy Araiza and Thomas Sinclair