



Analysis Seminar

Title: Capacity bounds for non-commutative graphs

Speaker: Ivan Todorov (QUB)

Date: Tue 12th November 2019 at 3:00PM

Location: Seminar Room SCN 1.25

Abstract: Non-commutative graphs – or, equivalently, operator subsystems of matrix algebras – arise naturally in quantum information theory as confusability graphs of quantum channels and play an important role in questions about zero-error information transmission. As in the classical case, the computation of the Shannon capacity of a non-commutative graph is a difficult problem that leads to the need to introduce easier computable bounds. In this talk, I will summarise some recent developments in this direction. In particular, I will describe non-commutative versions of the vertex packing polytope, the theta convex body and the fractional vertex packing polytope of a graph, and discuss a quantum version of the Sandwich Theorem of Grotschel, Lovasz and Schrijver. This leads to new non-commutative versions of the Lovasz number of a graph and an upper bound of the zero-error capacity of the corresponding quantum channel that can be genuinely better than the one originally established by Duan, Severini and Winter. I will also discuss non-commutative counterparts of several other widely used classical graph parameters and their interrelation.

This is joint work with Gareth Boreland and Andreas Winter.