Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

June 1 **David Jekel and Jennifer Pi**, UCSD and UCI

Title: *An elementary proof of $\chi \leq \chi^*$ and generalization to conditional entropy*

Through the study of large deviations theory for matrix Brownian motion, Biane-Capitaine-Guionnet proved the inequality $\chi(X) \leq \chi^*(X)$ that relates the two analogs of entropy in free probability defined by Voiculescu. We give a new proof of $\chi \leq \chi^*$ that is elementary in the sense that it does not rely on stochastic differential equations and large deviation theory. Moreover, we generalize the result to conditional microstates and non-microstates free entropy. Along the way, we give an alternative characterization of Shlyakhtenko's conditional microstates entropy and describe its relationship with classical conditional entropy.