

Graphons and Permutons

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Graphons will be known to some of the audience as limit structures for (dense) graphs; permutons play the same role, but for permutations.

Both of these concepts can be used to try to determine what large random combinatorial structures look like. For example, what does a "typical" graph look like that has edge density $1/2$ and triangle density only $1/16$? What does a random permutation look like that inverts the order of two numbers with probability $1/3$, instead of the usual $1/2$?

We will define graphons and permutons and explain the idea of a variational principle; then use these things to answer some questions like the ones above. It turns out that the graphs and permutations we encounter are closely related in some senses, but also display intriguing contrasts.

Included will be some joint research with Rick Kenyon, Dan Kral' and Charles Radin; and later, with Chris Coscia, Sayan Das, Sumit Mukherjee and Martin Tassy.