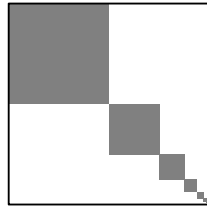


Open lectures for PhD students in computer science
 Combinatorial limits course by D. Král' and A. Grzesik
 Final exam problems

1. Consider $p \in [0, 1]$ and a graphon W such that $W(x, y) = p$ if $x, y \in [1 - 2^{-n+1}, 1 - 2^{-n}]$ for some $n \in \mathbb{N}$, and $W(x, y) = 0$ otherwise. For any $k \in \mathbb{N}$ determine the density of K_k in W .



2. Prove the inequality $\varpi \leq 3\Delta + 3/8$ and argue that any extremal graphon satisfies $\varrho = 1/4$ for almost all possible placements of the root.
3. Describe all graphons satisfying the equalities $\mathbb{I}((\varrho - 1)^2(\varrho - 1/2)^2)\bullet = 0$ and $\varrho = 3/4$.