

EXAM TOPICS INFINITE GRAPH THEORY II 2022 SOSE

- (1) Structural infinite generalisation of Menger's theorem by Aharoni and Berger: reduction to the finite case if a finite separation exists, existence of a maximal wave.
- (2) Linking safely a new vertex (using the lemmas from (1) without proofs), the proof when the digraph is countable (book¹ 232-237).
- (3) Elements of topological infinite graph theory: topological ends, $|G|$, Jumping Arc Lemma, basic properties (book 245-251).
- (4) Inverse limit of compact Hausdorff spaces, $|G|$ as the inverse limit of cell complexes of finite multigraphs (book 258-261).
- (5) The failure of Tutte's spanning tree packing theorem in infinite graphs ([paper](#)). and packing topological spanning trees (book 252-253).
- (6) The cycle space (book 268-271).
- (7) Fundamental concepts in combinatorial set theory ([ordinal numbers](#), cardinals, clubs, stationary sets, cofinality), [the fundamental theorem of cardinal arithmetic](#) and the [Hercules-Hydra game](#).
- (8) Elementary submodels: basic facts (Claims 2.7-3.8 [here](#)), Delta-system lemma (Theorem 4.1), Theorem 4.6, Fodor's lemma (Theorem 4.8)
- (9) Nash-Williams' theorem about edge-partitioning graphs into cycles (Theorem 5.1)
- (10) Ramsey's theorem and the Erdős-Dushnik-Miller theorem (Theorem 4.4).
- (11) Todorćević's "anti-Ramsey" result on K_{ω_1} (see Theorem 4 [here](#)).
- (12) Subgraphs of uncountably chromatic graphs (p. 20-22 [here](#)).

¹Graph theory 5. ed. by Reinhard Diestel