Fachbereich Mathematik | Universität Hamburg
Lecturer: Prof. Mathias Schacht | Fall 2017/18
Assistant: Oliver Ebsen | Oktober 26th, 2017

Graph Theory 2

Exercise Sheet 2

due on November 2, 1pm

http://bit.ly/2zPMMNz

Exercise 1 (§3.29) [1 Punkt]

Show that $2k$-edge-connected graphs are *k-edge-linked* in the sense that for all distinct vertices $s_1, \dots s_k, t_1, \dots, t_k$ there are edge-disjoint paths $P_i = s_i \dots t_i$ for $i = 1, \dots k$.

Exercise 2 (§3.30) [1 Punkt]

Show that k-linked graphs are $(2k-1)$-connected. Are they even $2k$-connected? Are they $2k$-connected if they have at least $2k+1$ vertices?

Exercise 3 (§3.31) [1 Punkt]

For every $k \in \mathbb{N}$ find an $\ell = \ell(k)$, as large as possible, such that not every ℓ-connected graph is k-linked.

Exercise 4 (§3.34) [1 Punkt]

Use Theorem 3.5.3 to show, that the function $h\colon \mathbb{N} \to \mathbb{N}$ in Lemma 3.5.1 can be chosen as $h(r) = cr^2$, for some c.

Written Exercise (§2.32)

Show that if G is k-linked and $s_1, \dots, s_k, t_1, \dots, t_k$ are not necessarily distinct vertices such that $s_i \neq t_i$ for all i, then G contains independent paths $P_i = s_i \dots t_i$ for $i = 1, \dots, k$ i.e., the inner vertices of the paths $P_1, \dots, P_k$ are pairwise disjoint.