Math 3322: Graph Theory[1] Mikhail Lavrov

The Graph Theorist's Guide to the Greek Alphabet

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This is a glossary of all the things in graph theory we write with Greek letters.

At least, to the ones that will show up in this class. There are many more!

- (ALPHA) $\alpha(G)$: the independence number of G.

  This is the maximum number of vertices in an independent set in G: a set $S \subseteq V(G)$ such that no two vertices in S are adjacent.

- (ALPHA) $\alpha'(G)$: the matching number of G.

  This is the maximum number of edges in a matching in G: a set $M \subseteq E(G)$ such that no two edges in M share an endpoint.

- (BETA) $\beta(G)$: the vertex cover number of G.

  This is the minimum number of edges in a vertex cover of G: a set $U \subseteq V(G)$ such that every edge of G has at least one endpoint in U.

- (BETA) $\beta'(G)$: the edge cover number of G.
- (DELTA) $\delta(G)$: the minimum degree of G. (The minimum degree of any vertex in G.)
- (DELTA) $\Delta(G)$: the maximum degree of G. (The maximum degree of any vertex in G.)
- (KAPPA) $\kappa(G)$: the (vertex) connectivity of G.

  This is the minimum number of vertices that have to be deleted from G to get a disconnected graph.

  As a special case, $\kappa(K_n)$ is defined to be $n-1$.

- (KAPPA) $\kappa'(G)$: the edge connectivity of G.

  This is the minimum number of edges that have to be deleted from G to get a disconnected graph.

  As a special case, $\kappa'(K_1)$ is sometimes defined to be 0, though really, who cares about K_1.

- *(LAMBDA) $\lambda(G)$ sometimes also denotes the edge connectivity of G. In particular, your textbook does this. I prefer the notation $\kappa'(G)$ because this follows the pattern of using $'$ to denote the "edge version" of an invariant.*
- (OMICRON, MAYBE) $o(G)$: the number of odd components in G.

  This is probably the Latin letter O, and not the Greek letter omicron, but you never know.

[1] This document comes from the Math 3322 course webpage: http://facultyweb.kennesaw.edu/mlavrov/courses/3322-fall-2021.php

- (TAU) $\tau(G)$: the number of spanning trees of G.
- (CHI) $\chi(G)$: the chromatic number of G.

  This is the least number of colors needed to color the vertices of G such that any two adjacent vertices have different colors.

  (Many variants of the chromatic number exist, and they are usually denoted with the letter χ, but decorated in some way—a subscript or superscript or whatnot.)
- (CHI) $\chi'(G)$: the edge chromatic number of G, sometimes called the chromatic index of G.

  This is the least number of colors needed to color the edges of G such that the edges incident to any vertex all have different colors.
- (OMEGA) $\omega(G)$: the clique number of G.

  This is the maximum number of vertices in a clique in G: a set $S \subseteq V(G)$ such that any two vertices in S are adjacent.