CO 342: Introduction to Graph Theory

Charles Shen

Fall 2016, University of Waterloo

Theorems and more reference sheet.

Feel free to email feedback to me at ccshen902@gmail.com.

Contents

1 The Basics

1.1 The Degree of a Vertex

Theorem 1.1.1. The number of vertices in a graph is always even.

The number $\delta(G) = min\{d(v)|v \in V\}$ is the **minimum degree** of G.
The number $\Delta(G) = max\{d(V)|v \in V\}$ is the **maximum degree** of G.
The **average degree ratio** of G is expressed as $\epsilon(G) = |E|/|V|$.

Theorem 1.1.2. Every graph G with at least one edge has a subgraph H with $\delta(H) > \epsilon(H) \geq \epsilon(G)$.

1.2 Paths and Cycles

Theorem 1.2.1. Every graph G contains a path of length $\delta(G)$ and a cycle of at least $\delta(G) + 1$ (provided that $\delta(G) \geq 2$).

Indices