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B8.5 Graph Theory

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Contents

1 Graph Theory Basics

In all definitions below, we assume $G = (V, E)$ is any graph.

1.1 Degrees

Definition 1.1 (Degree)

The *degree* of a vertex v, denoted $d_G(v)$ or simply $d(v)$, is the number of its incident edges.

$$d_G(v) = \big|\{w \in V : vw \in E\}\big|$$

If $d_G(v) = 0$, then we say v is an *isolated vertex*.

Definition 1.2 (Neighbor)

A vertex w is a *neighbor* of another vertex v if v and w are adjacent.
The *neighborhood* of v, denoted $N_G(V)$ or simply $N(v)$, is the set of all neighbors of v.

$$N_G(v) = \{w \in V : vw \in E\}$$