Lecture 4 handout

Aside: A __k-regular graph__ is a simple graph in which each vertex has valence k.

A __3-regular graph is called a cubic graph__.

Bonus: Matrices for graphs $V = \{v_1, \ldots, v_n\}$
                              $E = \{e_1, \ldots, e_m\}$

Adjacency matrix: $a_{ij} = $ #of edges between v_i and v_j
                              (loops count as 2)

$A = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 3 \\ 0 & 3 & 2 \end{pmatrix}$

Incidence matrix: $b_{ij} = \begin{cases} 1 & \text{if } v_i \text{ is incident to } e_j; \\ 2 & \text{if } e_j \text{ is a loop at } v_i; \\ 0 & \text{otherwise.} \end{cases}$

Laplacian matrix: $D = $ diagonal matrix of degrees of vertices.

$L = D - A$.

Next time: Directed graphs; Intro. to trees.

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