

日期:

/

Graph  $G(V, E, f)$

$V$ : vertex

...

$E$ : finite set call edges



$f$ : function call incidence function  $\{v_1, v_2\}$  显示 edge 链接的 vertex

$v$  and  $w$  are said incident to  $e$

$e$  said to be incident on  $v$  and  $w$

isolated vertices : vertex that not incident with any edge

parallel edges



The concept of degree

$\deg(v)$ ,  $d(v) = \sum_{in} + \sum_{out}$

loop,  $d(v) = 2$

Type of graphs

- simple graph, not contain parallel edges and any loops

- connected graph, there is a path from one point to other point

- regular graph, degree of each vertex of the graph is  $k$ .

- subgraph,  $G = (V, E)$   $H = (U, D)$ ,  $U \subseteq V$  and  $D \subseteq E$ .  $H =$  subgraph of  $G$

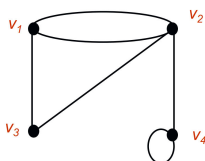
日期: /

## Graph Representation

2-dimensional array: adjacency matrix and incidence matrix

## Adjacency Matrices, $A_G$

undirected



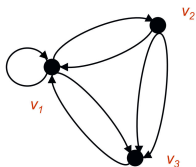
loop also count  
as 1

$$A_G = \begin{bmatrix} 0 & 2 & 1 & 0 \\ 2 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix}$$

is symmetric matrix

$$a_{ij} = a_{ji}$$

directed



$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 0 & 0 \end{bmatrix}$$

} digraph not symmetric matrix

日期:        /       

Incidence        Matrix