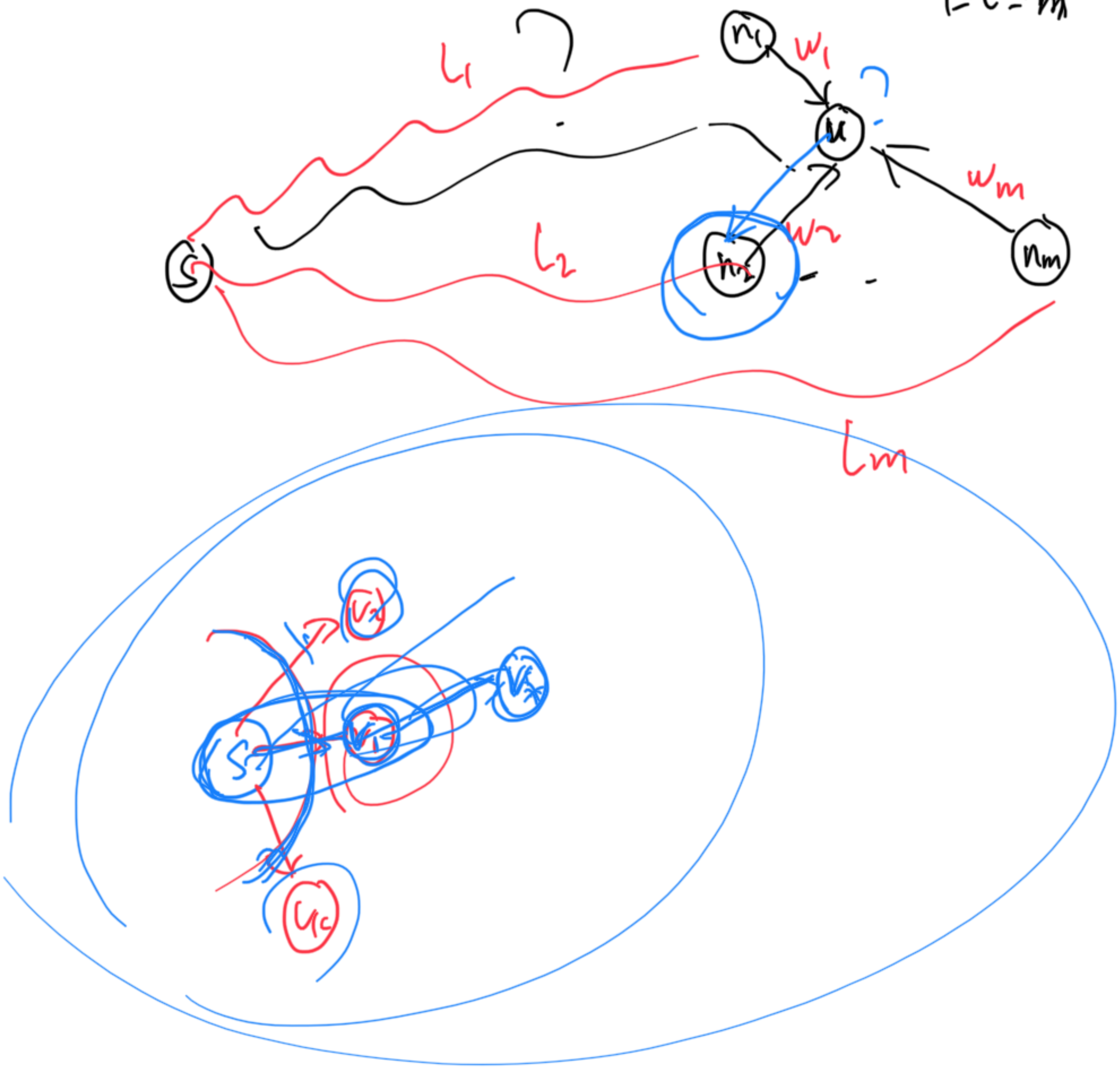
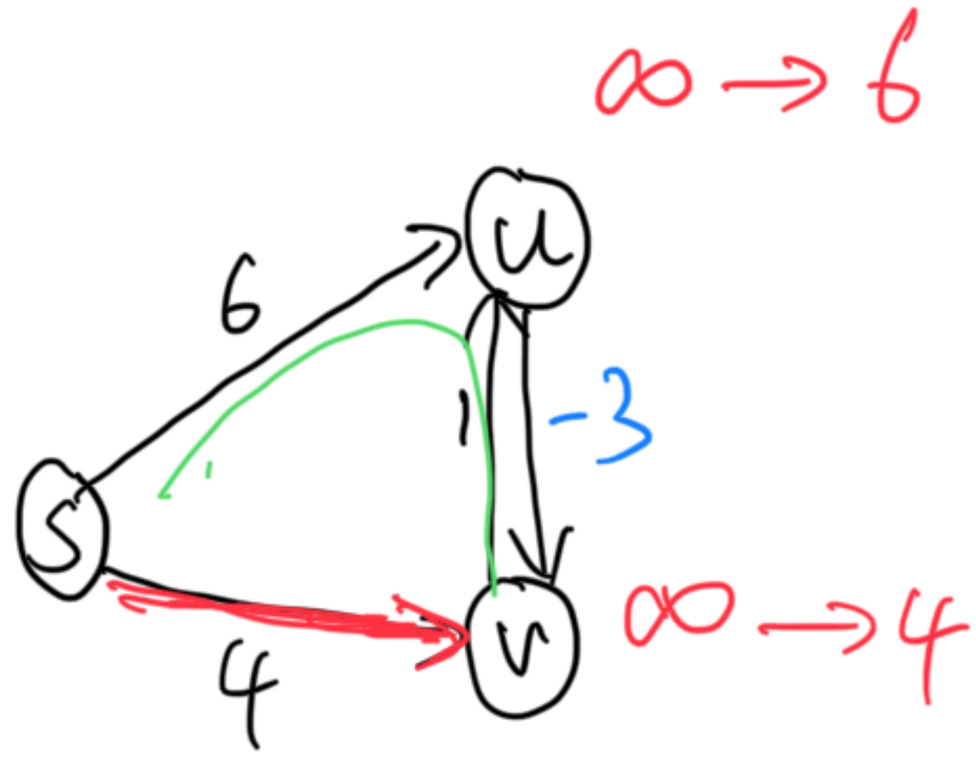
$$\min_{1\le i\le m}(l_i+w_i)$$





$6-3=3$

$\{s, v\}$

$\delta(s,v) = 4$ ✗

$\delta(s,v) = 4$

$\delta(s,u) = 5$

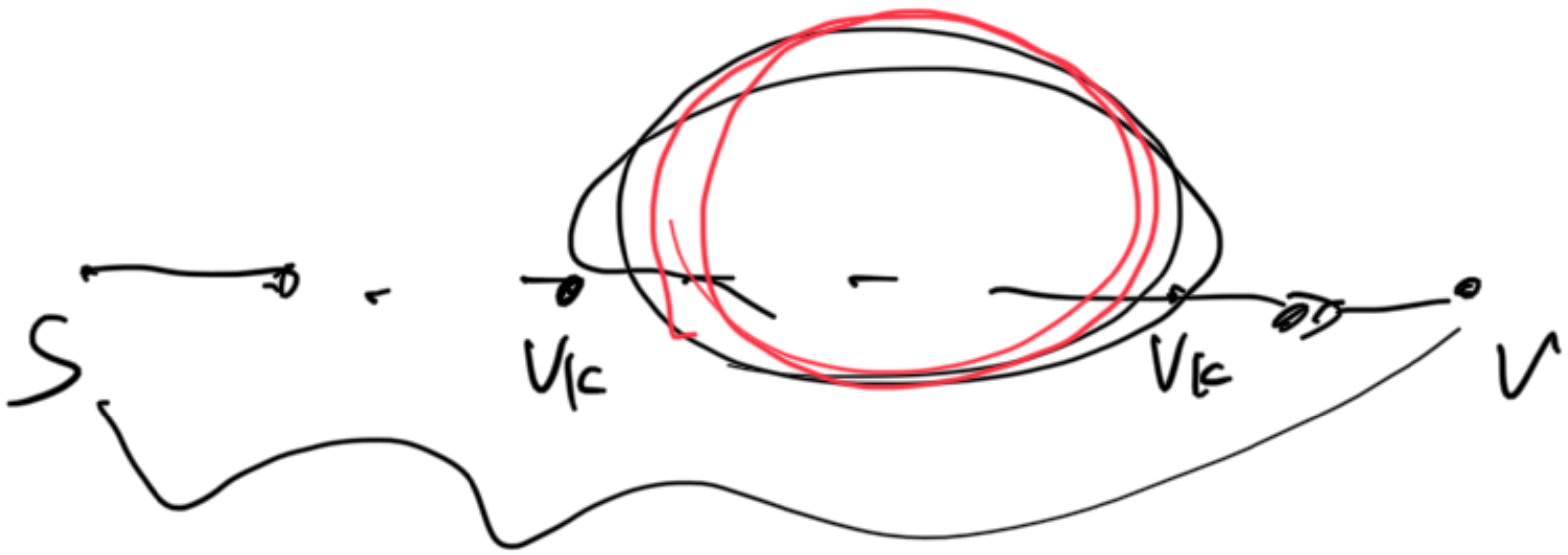
sub-problem : d[v] :— shortest path dist. from s to v

$\longrightarrow d^{(k)}[v] \longrightarrow$ length of the shortest path with at most k-hops from s to v

$$d^{(k)}[v] \geq d[v]$$

$$d^{(k)}[v] \geq d^{(k+1)}[v]$$

$$d^{(0)} \geq d^{(1)} \geq d^{(2)} \cdots \geq d^{(k)} \geq d$$



$|V|-1$ hops

$$d^{(|V|-1)} = d$$

$$d^{(|V|)} < d^{(|V|-1)}$$

$$d^{(k)} \rightarrow d^{(k+1)}$$

$d^{(0)}$

$d(s) = 0$

$d(v) = \infty$

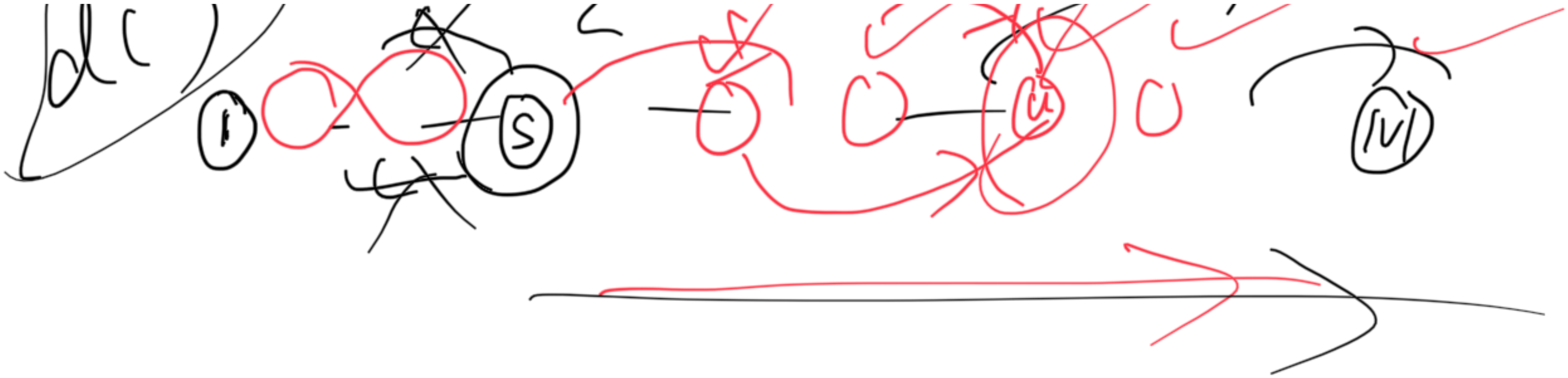
$$d^{(k+1)}(u) = \min_{1 \le i \le m} \left\{ d^{(k)}(n_i) + w(n_i, u) \right\}$$

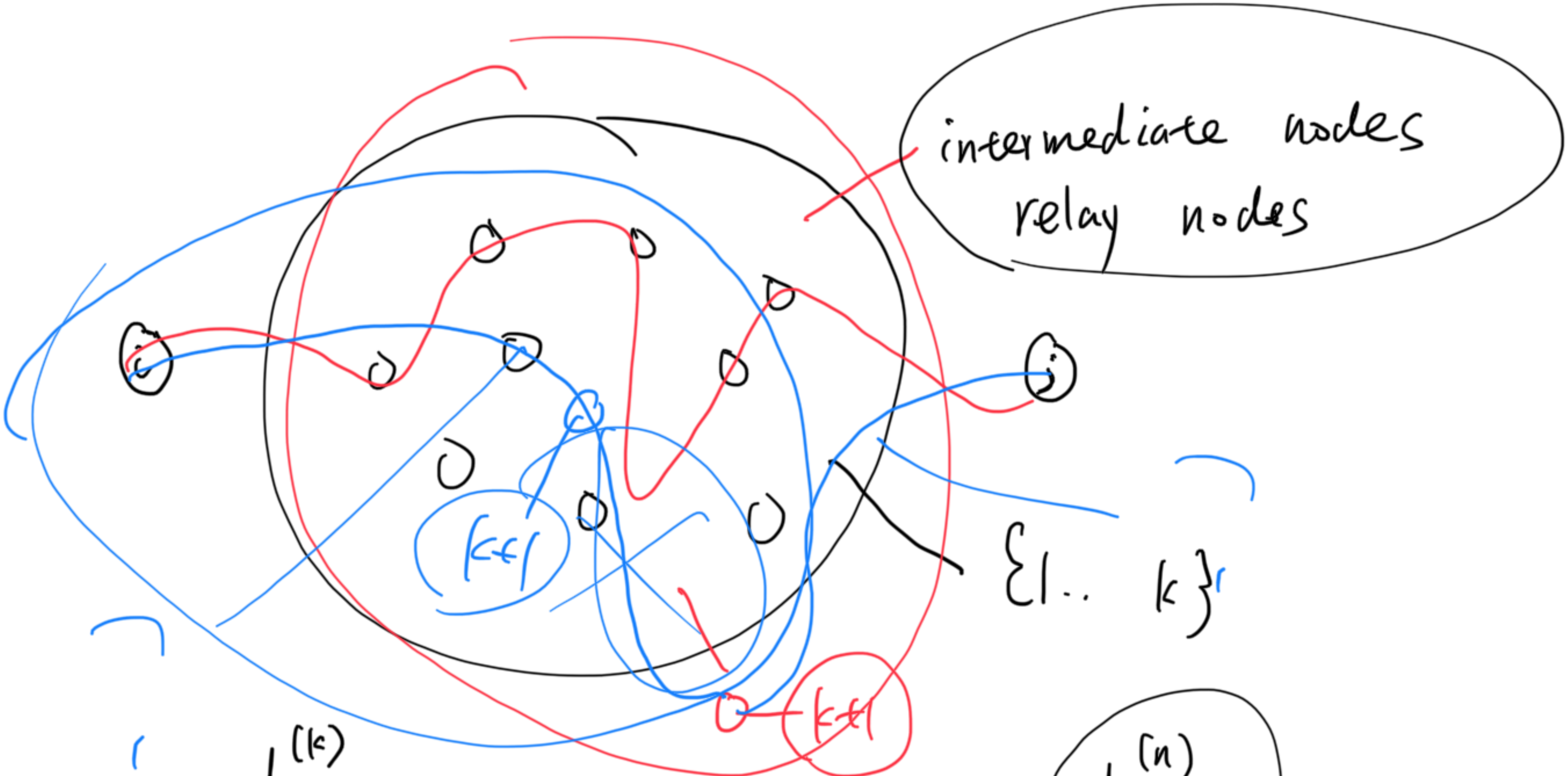
$|V| - 1$

$d(n_i)$

$|V| - 1$

$d^{(k)}$





$d_{ij}^{(k)} \longrightarrow d_{ij}^{(n)}$

$d_{ij}^{(0)} = w_{ij}$

(n)

$$d_{ij} = d_{ij}$$

$$d_{ij}^{(k)} \geq d_{ij}^{(k+1)}$$

$$d_{ij}^{(k)} \longrightarrow d_{ij}^{(k+1)}$$

$$d_{i(k+1)}^{(k)} + d_{(k+1)j}^{(k)} \longrightarrow d_{ij}^{(k)}$$