walk

$$W = (v_0, \varepsilon_1, v_1, \ldots, \varepsilon_n, v_n) \quad n \geq 0$$

$n+1$ vertices $v_0, \ldots, v_n$

n indicators $\varepsilon_1, \ldots, \varepsilon_n \in \{1, -1\}$

$$\varepsilon_j = 1 \Rightarrow (v_{j-1}, v_j) \in E(D)$$

$$\varepsilon_j = -1 \Rightarrow (v_j, v_{j-1}) \in E(D)$$

path ... vertices pairwise different

directed path (walk) ... $\varepsilon_1 = \varepsilon_2 = \ldots = \varepsilon_n$

alternating path (walk) ... indicators alternate

weight of a walk W

$$\omega(W) = \varepsilon_1 + \ldots + \varepsilon_n$$

$u, v \in V(D)$

u is R_k^+ - related to v ($u R_k^+ v$) if there exists a walk $W(u,v)$ with

$$\omega(W) = 0$$

$$\omega({}_0W_j) \in [0, k]$$