3. Quotients

τ ... partition given by R_1^+

$k \geq 2$, $u, v \in V(D)$

$u R_k^+ v$ if and only if $u_\tau R_{k-1}^+ v_{\tau-1}$

4. Property $\mathbb{Z}$

A digraph D has **property $\mathbb{Z}$** if there exists a digraph homomorphism onto the two-way infinite dipath.

D ... infinite loc. finite transitive

If for **each $k \geq 1$** at least one (and hence both) of the relations R_k^+ and R_k^- has **finite equivalence classes**, then D has **property $\mathbb{Z}$.**