

$$L >_{xdepth} R \quad \text{iff} \quad \sum_{n \in L.leaves_{cipher}} xdepth_L(n) > \sum_{n \in R.leaves_{cipher}} xdepth_R(n) \quad (1)$$

$$\wedge \forall v \in Var_{cipher}(L) \quad (xdepth_L(v) \geq xdepth_R(v) \wedge |L|_v \geq |R|_v)$$

$$L >_{cipher_vars} R \quad \text{iff} \quad \begin{aligned} &\exists v_0 \in Var_{cipher}(L) \quad |L|_{v_0} > |R|_{v_0} \\ &\wedge \quad \forall v \in Var_{cipher}(L) \quad |L|_v \geq |R|_v \end{aligned} \quad (2)$$

$$L >_{he_mul} R \quad \text{iff} \quad |L|_{he_mul} > |R|_{he_mul} \wedge \forall v \in Var_{cipher}(L) \quad |L|_v \geq |R|_v \quad (3)$$

$$L >_{he_square} R \quad \text{iff} \quad |L|_{he_square} > |R|_{he_square} \wedge \forall v \in Var_{cipher}(L) \quad |L|_v \geq |R|_v \quad (4)$$

$$L >_{he_rotation} R \quad \text{iff} \quad |L|_{he_rotation} > |R|_{he_rotation} \wedge \forall v \in Var_{cipher}(L) \quad |L|_v \geq |R|_v \quad (5)$$

$$L >_{rotation_steps} R \quad \text{iff} \quad \sum_{op \in L.Op_{rotation}} op.step > \sum_{op \in R.Op_{rotation}} op.step \quad (6)$$

$$\begin{aligned} &\wedge \forall op \in (R.Op_{rotation} \cup L.Op_{rotation}) \quad (op.step \geq 0 \wedge op.step < nb_slots) \\ &\wedge \quad \forall v \in Var_{cipher}(L) \quad |L|_v \geq |R|_v \end{aligned}$$

$$L >_{he_add_sub} R \quad \text{iff} \quad |L|_{he_add_sub} > |R|_{he_add_sub} \wedge \forall v \in Var_{cipher}(L) \quad |L|_v \geq |R|_v \quad (7)$$

$$L >_{leaves} R \quad \text{iff} \quad |L|_{leaves} > |R|_{leaves} \wedge \forall v \in Var(L) \quad |L|_v \geq |R|_v \quad (8)$$