Ideal Quaternary Semantics of Attack Trees

Basic Properties for Sequence:

$$(A \rhd_I A) \not\equiv A$$

$$(A \rhd_I B) \not\equiv (B \rhd_I A)$$

$$(A \rhd_I (B \rhd_I C)) \equiv ((A \rhd_I B) \rhd_I C)$$

If $A \leq_4 C$ and $B \leq_4 D$, then $(A \rhd_I B) \leq_4 (C \rhd_I D)$

$$(A \rhd_I (B \sqcup_I C)) \equiv ((A \rhd_I B) \sqcup_I (A \rhd_I C))$$

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Ideal Properties [Horne et al.:2016]:

$$((A \odot_I B) \rhd_I (C \odot_I D)) \leq_4 ((A \rhd_I C) \odot_I (B \rhd_I D))$$

$$((A \odot_I B) \rhd_I C) \leq_4 (A \odot_I (B \rhd_I C))$$

$$(A \rhd_I (B \odot_I C) \leq_4 (B \odot_I (A \rhd_I C))$$

$$(A \rhd_I B) \leq_4 (A \odot_I B)$$

Note: Not equivalences!