Ideal Quaternary Semantics of Attack Trees

Choice:
$$A \sqcup_I B = \mathsf{max}(A, B)$$

Sequence:
$$0 \rhd_I B = 0$$
$$A \rhd_I 0 = 0$$
$$A \rhd_I B = \frac{1}{2}, \text{ when } A \in \{\frac{1}{2}, 1\}$$

Parallel:
$$0 \odot_I B = 0$$
$$A \odot_I 0 = 0$$
$$A \odot_I B = 1$$

Ideal Quaternary Semantics of Attack Trees

Logical Sequent (implication) is a Partial Ordering:

$$A \leq_4 B$$

Equivalence of Attack Trees:

$$A \equiv B \quad \text{iff} \quad (A \leq_4 B) \text{ and } (B \leq_4 A)$$