1 Publication Predicate

pub is a decision procedure for finding the set of publications of an expression given a context for variables, i.e. \( \text{pub} : \text{Expression} \rightarrow \text{Context} \rightarrow \{\text{Publication}\} \).

\[ \text{Context} = \text{Variable} \rightarrow \text{Publication} \]

\( \text{Publication} = (\text{Predicate}, \text{Predicate}) \)

where the first is a predicate denoting the value published and the second a predicate which holds iff the value was published.

\[
\text{pub}[-x] E = \{ (\neg v, c) \}
\]

where \( (v, c) = E(x) \)

\[
\text{pub}[x || y] E = \{ (v \lor v', c \land c') \}
\]

where \( (v, c) = E(x), (v', c') = E(y) \)

\[
\text{pub}[x && y] E = \{ (v \land v', c \land c') \}
\]

where \( (v, c) = E(x), (v', c') = E(y) \)

\[
\text{pub}[\text{if}(x)] E = \{ (\text{signal}, \text{v} \land \text{c}) \}
\]

where \( (v, c) = E(x) \)

\[
\text{pub}[\text{M}(x)] E = \{ (\_, \_ \land \text{c}) \}
\]

where \( (\_, c) = E(x) \)

\[
\text{pub}[\text{f}(x)] E = \text{pub} \text{g} (E + f : (\_, \text{false}) + y : E(x))
\]

where \( \text{def} f(y) = g \)

\[
\text{pub}[f \gg g] E = \{ \text{vc} \Rightarrow \text{vc'} \Rightarrow \text{pub} g (E + x : \text{vc}), \text{vc} \Leftarrow \text{pub} f E \}
\]

\[
\text{pub}[g \ll f] E = \{ \text{vc} \Rightarrow \text{vc'} \Rightarrow \text{pub} g (E + x : \text{vc}), \text{vc} \Leftarrow \text{pub} f E \}
\]

\[
\text{pub}[f \mid g] E = (\text{pub} f E) \cup (\text{pub} g E)
\]

\[
\text{pub}[f ; g] E = \text{fp} \cup \{ (v', c' \land (\neg \text{c})) \mid (\_, \text{c}) \Leftarrow \text{fp}, (v', c') \Leftarrow \text{gp} \}
\]

where \( \text{fp} = (\text{pub} f E), \text{gp} = (\text{pub} g E) \)