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Tutorials for Decision Procedures Exercise Sheet 14

Exercise 1: Interpolation for T_E

4 Points

Compute the Craig interpolant for each of the following Σ_E -formula pairs.

(a)

$$F : a = y \wedge x = f(a) \wedge z = w \wedge a \neq c$$
$$G : c = b \wedge b = x \wedge f(y) \neq z \wedge w = b$$

(b)

$$F : a = f(f(f(a))) \wedge f(a) = x \wedge p(a)$$
$$G : f(f(b)) = f(b) \wedge b = x \wedge \neg p(f(b))$$

Exercise 2: Interpolation for T_Q

4 Points

Compute the Craig interpolant for the following Σ_Q -formula pair.

$$F : x \geq a \wedge a \geq -2y + 1 \wedge 2a + y \geq 1$$
$$G : x + y \leq \frac{1}{2}$$

Exercise 3: Interpolation for non-conjunctive formulas

4 Points

Compute the Craig interpolant for the following propositional formula pair (which is in clause form).

$$F : \{\{P_1, P_3\}, \{P_1, \overline{P_2}, \overline{P_4}\}, \{\overline{P_2}, \overline{P_5}\}, \{P_2, P_5\}, \{\overline{P_1}, \overline{P_3}\}, \{P_4, \overline{P_5}\}, \{P_1, \overline{P_5}\}\}$$
$$G : \{\{\overline{P_3}, P_6\}, \{P_3, \overline{P_6}, P_7\}, \{\overline{P_1}, \overline{P_4}, \overline{P_6}\}, \{P_4, \overline{P_7}\}, \{\overline{P_4}, P_7\}, \{P_1, P_4\}, \{P_6, \overline{P_7}\}, \{P_1, P_6\}, \{\overline{P_1}, P_7\}\}$$