Call graph & BDP

\[ X_0 \ x_{1} \ x_{2} \ x_{3} \]

Diagram showing nodes A, B, C with connections and a box with tuples (x₀, x₁), (x₀, 11), (x₁, x₀).
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$e(x^3) = 0$

$e(x^2) = 1$
Exists

\( \exists x_3, \; B \| x_3 \) is satisfiable

Apply (OR, \( B \| x_3=0 \), \( B \| x_3=1 \))
\[ \text{Exist } (x_3, 13) : \exists \text{ Apply (OR, B)}_{x_3=0}, B_{x_3=1} \]
\( x_0 = 0 \land x_1 = 0 \) \\
\( \lor \left( x_0 = 0 \land x_1 = 1 \right) \land x \leq 1 \)
Only check live range at their starting points.

Leverage this behavior.

Live range = Reach()
\[ N = 2 \quad r_0 \quad r_1 \]

Diagram:

- Nodes: A, B, C
- Connections: A → B, A → C, B → C

Additional notes:
- \( r_0 \) and \( r_1 \) are annotations near the nodes.
BDP

Call graph

A

B

C

01

fn A

call B

fn B

call C

fn A

call B

C

10

fn B

call C

C

10
\text{edge}( (x_1, x_2), (x_3, x_4))
\begin{align*}
&x_0 x_1 x_2 x_3 \\
\{ \begin{align*}
&\text{e}( (0, 0), (1, 1)) = 1 \\
&\text{e}( (0, 0), (0, 1)) = 1 \\
&\text{e}( (0, 1), (1, 0)) = 1 \\
&\forall \text{others} = 0
\end{align*} \}
\end{align*}
e \text{ is a boolean func}
\text{use BDD}