

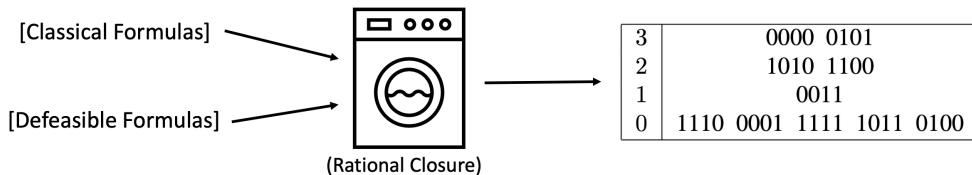
Extending Defeasible Reasoning Beyond Rational Closure

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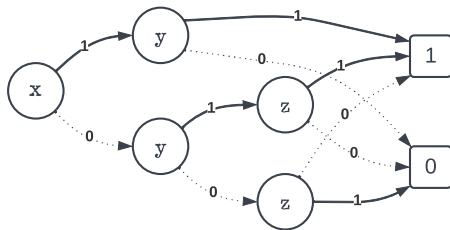
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Rational Closure



Reduced Ordered Binary Decision Diagrams

Created by Richard Bryant in 1986 to provide compact, canonical representations of complex Boolean functions.



x	y	z	α
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

$$\alpha = (\neg x \wedge \neg y \wedge \neg z) \vee (x \wedge y) \vee (y \wedge z)$$

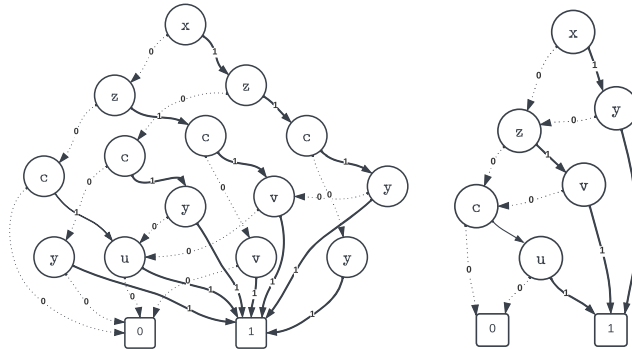
ROBDD Procedures

Various algorithms for performing useful procedures on ROBDDs.

- Count the number of models.
- List all the models (bad idea).
- Combine using Boolean algebra.

Variable Ordering

- Computing best ordering shown to be NP-hard.
- Various algorithms for computing "good enough" ordering.



$$\alpha = x \wedge y \vee z \wedge v \vee c \wedge u$$

Reduced Ranked Interpretations - Example 1

2	pbwf pbwf				
1	$\overline{p}\overline{b}\overline{w}\overline{f}$	$\overline{p}\overline{b}\overline{w}f$	$\overline{p}\overline{b}w\overline{f}$	$\overline{p}\overline{b}wf$	$\overline{p}b\overline{w}\overline{f}$
0	$\overline{p}\overline{b}w\overline{f}$	$\overline{p}\overline{b}wf$	$\overline{p}b\overline{w}\overline{f}$	$\overline{p}b\overline{w}f$	$\overline{p}bwf$

2	fbp		
1	$\overline{w}b\overline{p}$	$\overline{f}wb\overline{p}$	$\overline{f}bp$
0	$\overline{b}\overline{p}$	$fwb\overline{p}$	

∞	$p \rightarrow b$		
1	$p \vdash \neg f$		
0	$b \vdash f$	$b \vdash w$	

Reduced Ranked Interpretations - Example 2

∞	$p \rightarrow b$	$r \rightarrow p$	$n \rightarrow r$	
3	$n \vdash \neg f$	$n \vdash j$	$n \vdash k$	$n \vdash l$
2	$r \vdash f$	$r \vdash z$	$r \vdash x$	
1	$p \vdash \neg f$	$p \vdash t$	$p \vdash y$	$p \vdash u$
0	$b \vdash f$	$b \vdash q$	$b \vdash w$	$b \vdash e$ $b \vdash h$

4	$\bar{j}nr\bar{f}bp$	$\bar{k}jnr\bar{f}bp$	$\bar{l}kjr\bar{f}bp$	$\bar{n}zr\bar{f}bp$	$\bar{n}x\bar{z}r\bar{f}bp$	$nxzr\bar{f}bp$
3		$\bar{n}r\bar{f}bp$	$lkjr\bar{f}bp$	$\bar{n}zr\bar{f}bp$	$\bar{n}x\bar{z}r\bar{f}bp$	
2		$\bar{n}t\bar{r}\bar{f}bp$	$\bar{n}y\bar{t}\bar{r}\bar{f}bp$	$\bar{n}u\bar{y}\bar{t}\bar{r}\bar{f}bp$	$\bar{n}r\bar{f}bp$	$\bar{n}x\bar{z}r\bar{f}bp$
1	$\bar{n}r\bar{f}bp$	$\bar{n}r\bar{q}\bar{f}bp$	$\bar{n}r\bar{w}\bar{q}\bar{f}bp$	$\bar{n}r\bar{e}\bar{w}\bar{q}\bar{f}bp$	$\bar{n}r\bar{h}\bar{e}\bar{w}\bar{q}\bar{f}bp$	$\bar{n}u\bar{y}\bar{t}\bar{r}\bar{f}bp$
0		$\bar{n}r\bar{f}bp$	$\bar{n}r\bar{f}bp$	$\bar{n}r\bar{h}\bar{e}\bar{w}\bar{q}\bar{f}bp$		

The End

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