THE EXTENSIONAL CONSTRAINT

Doctoral Program CP2019

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	x	y	z
τ_1	a	a	a
τ_2	d	d	a
τ_3	c	e	b
$\vdots$	$\vdots$	$\vdots$	$\vdots$

Tables are the oldest most used CP constraints

MDDs are equivalent to tables

AC3   AC4   GAC4   AC5   AC6   GAC-Schema   AC2001   AC2001/3.1   STR   MDDC   STR2   STR3   ShortSTR2   MDD4R   SmartTable   CT

1980   1985   1990   1995   2000   2005   2010   2015
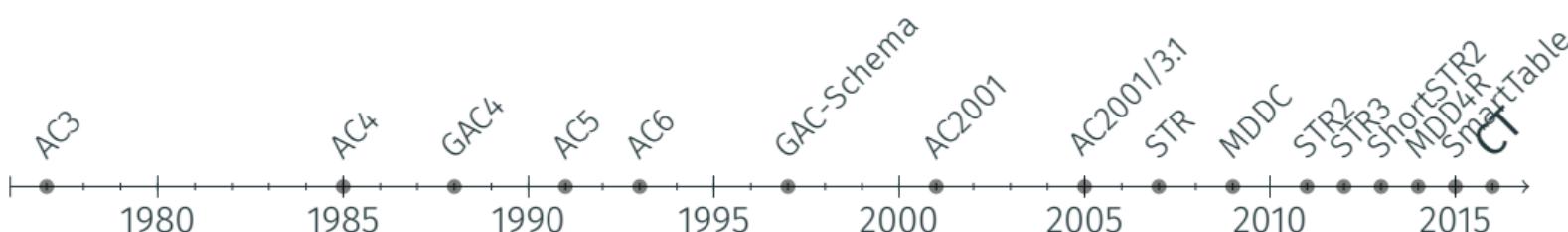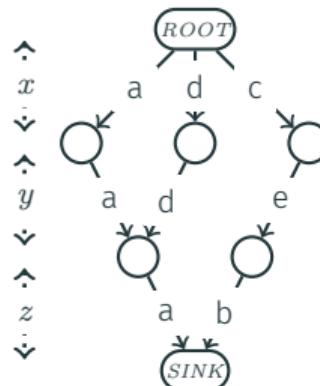
2016 : New algorithm! Compact-Table [CP2016], based on bitwise operations, completely outperformed existing algorithms

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|	x_1	x_2	x_3
τ_1	a	c	a
τ_2	b	b	b
τ_3	a	c	b
τ_4	c	a	b
τ_5	b	c	b
τ_6	c	b	c
τ_7	a	a	b
τ_8	b	b	c

CT

Input of **CT**: A positive Table (contains accepted solutions)

	x	y	z
τ_1	$*$	$*$	$\in \{a, b\}$
τ_2	$\neq a$	c	$\leq a$
τ_3	b	$*$	$*$
τ_4	$\geq c$	$\neq b$	a
	$\vdots$	$\vdots$	$\vdots$

Input of CT_{bs}: A positive Basic Smart Table (unary compression using $*, \neq, \leq, \geq, \in$)
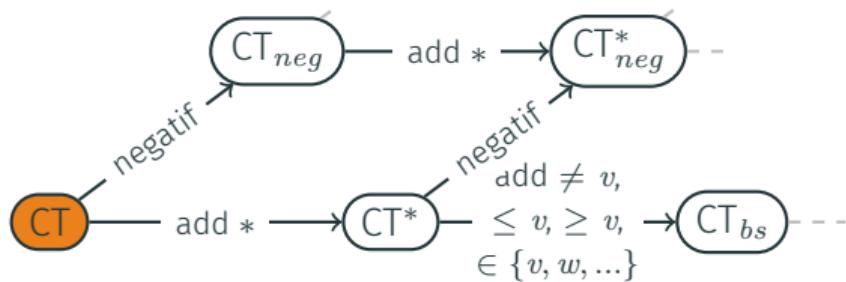
	x_1	x_2	x_3
τ_1	a	c	a
τ_2	b	b	b
τ_3	a	c	b
τ_4	c	a	b
τ_5	b	c	b
τ_6	c	b	c
τ_7	a	a	b
τ_8	b	b	c

Input of CT_{neg}: A negative Table (contains rejected solutions)
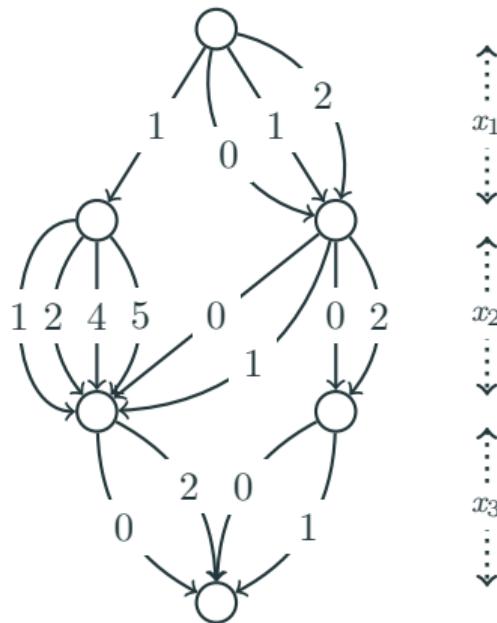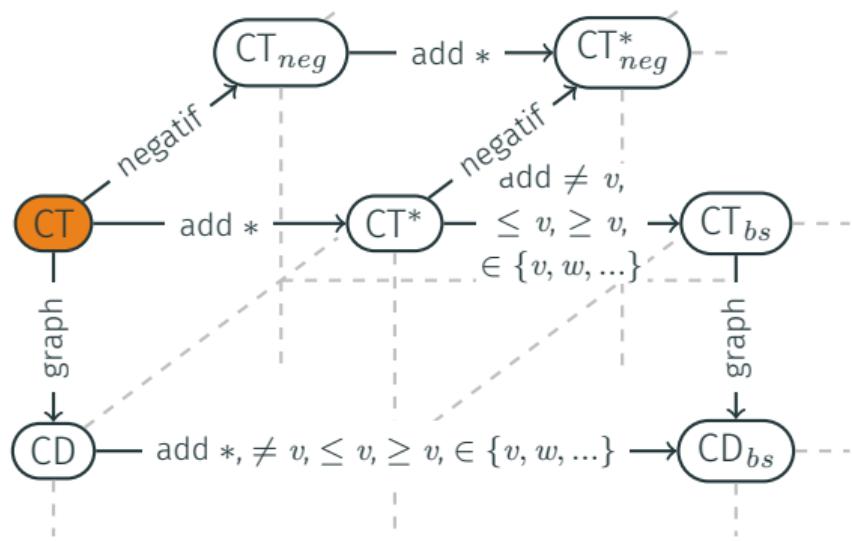
Input of **CD**: A positive MDD or MVD (layered diagram)
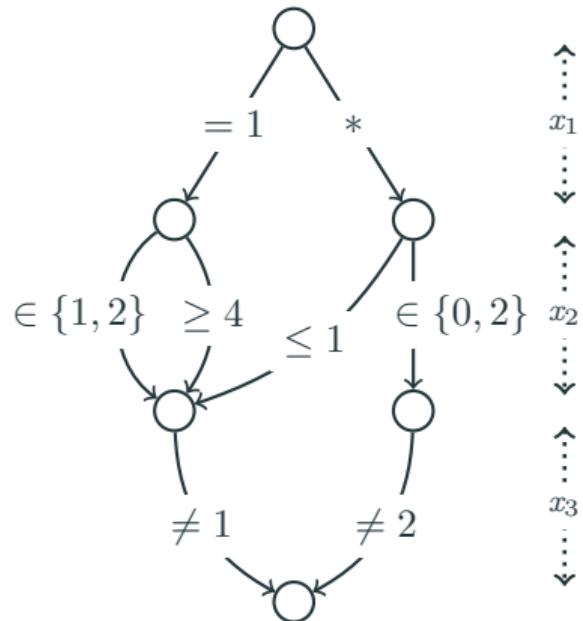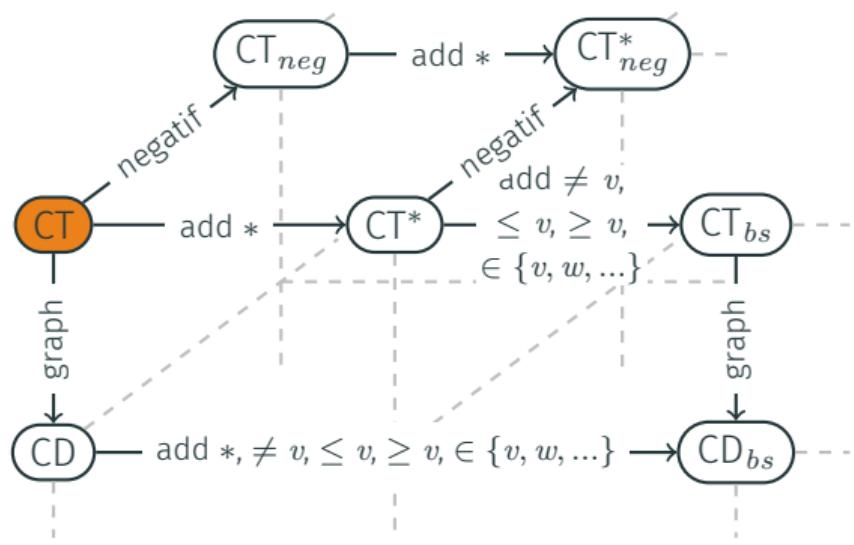
Input of CD_{bs}: A positive Basic smart MDD or MVD

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- Modelling:
    - increase expressiveness
    - various tools available for users:
      Tables, Negative Tables, Basic Smart Tables, MDDs/MVDs, Basic Smart MDDs/MVDs
    - reduction of the storage size

- Propagators:
    - efficient algorithms
    - increased resolution speed
    - no model decompression

· H. Verhaeghe, C. Lecoutre and P. Schaus. **Extending Compact-Table to Negative and Short Tables.** AAAI17

· H. Verhaeghe, C. Lecoutre, Y. Deville and P. Schaus. **Extending Compact-Table to Basic Smart Tables.** CP2017

· H. Verhaeghe, C. Lecoutre, P. Schaus. **Compact-MDD: Efficiently filtering (s)mdd constraints with Reversible Sparse Bit-Sets.** IJCAI18

· H. Verhaeghe, C. Lecoutre, P. Schaus. **Extending Compact-Diagram to Basic Smart Multi-Valued Variable Diagrams.** CPAIOR19