

# CNF · SAT

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January 9, 2024

TODO A CNF-SAT is an equation ...

## 1 Equations

Set Notation · CNF	$\{\{a, \bar{b}\}, \{b, \bar{c}, \bar{d}\}, \{\bar{a}, \bar{c}\}\}$
Arithmetic · CNF	$(a + \bar{b}) \cdot (b + \bar{c} + \bar{d}) \cdot (\bar{a} + \bar{c})$
Negated · DNF	$\neg(ab + \bar{b}cd + ac)$

## Formulas

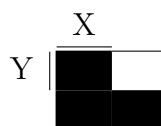
**Zugzwang.** If a disjunction consists of one literal, the value of this literal is fixed.

$$\{X\} \in S \Rightarrow X = \top$$

**Absorption.** If a disjunction is a superset of another disjunction, it can be ignored.

$$\forall X \subseteq Y : X \cdot Y \equiv_{\text{CNF}} X$$

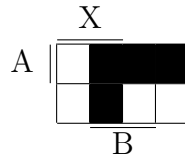
Proof:  $(X \Rightarrow Y) \vee \neg X$  makes  $Y$  irrelevant.



The Absorption Rule allows to freely create new disjunctions, as long it's consisting of an already existing disjunction.

**Common Contradiction.**

$$(A + X) \cdot (B + \overline{X}) \equiv_{\text{CNF}} (BX + A\overline{X})$$



**Common Part.**

$$(A + X) \cdot (B + X) \equiv_{\text{CNF}} (X + AB)$$

