canons

Page Layout with Margin Control

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Table 1: Engines and formats with which canons was tested.

Abstract

canons implements classical page-layouts as deterministic, scale-equivariant rules for LaTeX documents. The package provides five canonical systems and applies them via geometry: Van de Graaf; Villard de Honnecourt; Tufte; Canon des Ateliers; grid. The package operates on either the page frame (W, H) or leaf frame $(W - g, H)$ depending on gutter mode. Margin semantics (`symmetric`, `antisymmetric`, `right`, `left`) are explicit and class-aware. All computations occur at document start, with exported lengths for downstream packages. Options relevant to geometric control not owned by canons are forwarded transparently to geometry where appropriate to do so. A comprehensive package details section provides information condensed for at-a-glance review.

Contents

1 Introduction

This package codifies several classical page canons as explicit mathematical rules and applies them through geometry. The codified canons include:

Van de Graaf medieval proportions; text block matches page aspect.

Villard de Honnecourt parametric family ($N = 3, 6, 9, 12, 15$); flexible margins.

Tufte asymmetric with wide outer margin for extensive notes.

Canon des Ateliers three styles (ordinary, neater, luxury) from French typographic tradition.

Grid modern $N \times N$ modular system with full control.

Key features of canons:

- Deterministic: same inputs = same output, always
- Class-agnostic: works with standard classes `article`, `book`, `report`
- Margin modes: `symmetric`, `antisymmetric`, `right`, `left` place the marginspace on alternating outer margins, inner margins, only on the right, or only on the left, respectively
- Gutter support: binding allowance with two calculation modes
- Exports dimensions for downstream margin-aware content

Our goal is that canons be useful for historically-grounded proportions *without* adopting a full document class. The package computes margins as fractions of page dimensions and applies them through geometry. It is meant to be a lightweight, flexible variation on geometry: canons handles the math; geometry the implementation.

Some minimal examples for a quick start:

```
% Classic book
\usepackage[canon=vdg, margins=symmetric, gutterval=8mm]{canons}

% Notes-heavy single-sided
\usepackage[canon=tufte, margins=right, paper=letterpaper]{canons}

% Economical textbook
\usepackage[canon=vdh, vdhN=12, paper=a4paper]{canons}
```

```
% Luxury display
\usepackage[canon=ateliers, ateliersstyle=luxury]{canons}

% Exact Van de Graaf via Grid
\usepackage[canon=grid, gridN=9, gridinner=1, gridouter=2, gridtop=1,
   gridbottom=2]{canons}
```

2 What is a page canon?

Page-construction canons are modern reconstructions of historical text-setting, derived from measuring surviving books and inferring the underlying geometry and craft used to divide a page into proportionate text areas and margins. Popularized in the 20th century by Jan Tschichold after work by J. A. van de Graaf, Raúl Rosarivo, Hans Kayser, and others, these rules still influence contemporary book design, adapted to standardized papers and diverse production needs.

Etymology. *Canon* comes via Latin *canon* 'rule; standard' from Greek *kanōn* 'straight rod; measuring rule'. The sense 'rule/standard' also underlies *canon law* and the musical *canon*.

What a canon does. In practical terms, a canon takes a page's dimensions and determines where to place margins and text according to certain rules or desired proportions. It non-arbitrarily:

- calculates margin sizes;
- positions the text block on the page;
- maintains proportions across paper sizes;
- optionally allocates space for marginalia, headers, and footers.

Formal definition. We define a *canon* as a *layout rule* such that the result is reproducible and predictable. In particular, a canon is a *scale-equivariant* rule that, operating on a declared frame (page or leaf rectangle), deterministically produces a textblock and margins; the rule may be given *algebraically* (ratios as

functions of dimensions) or *geometrically* (a constructive procedure). The canon must declare its operative frame, domain of validity, and fallback behavior.

Let $W =$ `\paperwidth`, $H =$ `\paperheight`, and $g =$ gutter width.

Definition 1. *A **page canon** is a* scale-equivariant *layout rule*

$$\mathcal{C} : (F, \Xi) \longrightarrow \Theta,$$

where:

- F *is a (rectangular)* frame*, chosen from:*
  - ***page frame*** $P = [0, W] \times [0, H]$*, whose four edges are designated* inner*,* outer*,* top*,* bottom *according to binding orientation;*
  - ***leaf frame*** *with gutter g: for recto leaf $L_r = [g, W] \times [0, H]$; for verso leaf $L_v = [0, W - g] \times [0, H]$.*
- Ξ *is an optional set of* parameters/constraints *(e.g., grid divisions N; a baseline step; desired ratios; style flags).*
- Θ *is a* layout solution*: at minimum a textblock rectangle $T \subseteq F$, equivalently specified by margins (m_i, m_o, m_t, m_b); may also include footer, header bands, and marginalia measures (`marginparwidth`, `marginparsep`), etc..*

Scale-equivarence requires that, for any scaling factor $\lambda > 0$, $\mathcal{C}(\lambda F, \Xi) = \lambda \mathcal{C}(F, \Xi)$; that is, scaling the frame scales the output layout proportionally. A canon *must* declare whether it operates on P or on L.

Two presentations. The same canon admits two presentations: algebraic (parametric); geometric (constructive).

Definition 2. *The **parametric (algebraic) canon** gives* functions *of the operative frame dimensions.*

Define the *operative dimensions* W_*, H_* as the frame dimensions on which canon calculations operate:

$$W_* = \begin{cases} W & \text{(page-frame mode: } \texttt{guttermode=geometry}\text{)} \\ W - g & \text{(leaf-frame mode: } \texttt{guttermode=satzspiegel}\text{)} \end{cases}, \qquad H_* = H.$$

Margins are then given by:

$$m_j = f_j(W_*, H_*, \Xi) \cdot \begin{cases} W_* & \text{for horizontal margins (inner, outer),} \\ H_* & \text{for vertical margins (top, bottom),} \end{cases}$$

where each f_j is a dimensionless ratio function.

Definition 3. *The* ***constructive (geometric) canon*** *specifies a* procedure *on F (e.g., subdivide, draw diagonals, intersect lines) that* yields *a unique textblock T.*

The resulting fractions are *derived*, and may depend on the page aspect H/W; they need not be 'nice' rationals.

The parametric form is what we implement; the constructive form shows where these proportions originally came from and helps us understand why certain relationships exist: formulas *build*, constructions *justify*.

Requirements check A canon is a *rule* we can test: it should behave predictably under scaling, declare the space it acts on (page or leaf), say where it works and what happens when it does not, produce an unambiguous textblock, and change smoothly when inputs do. It should:

1. all outputs scale by factor $\lambda > 0$; units must not matter;
2. the canon declares its operative frame (page or leaf) and the recto/verso mapping of inner/outer;
3. explicitly state the aspect ratios/parameters where the construction is valid, and a fallback policy when not;
4. fixed inputs give us a unique T, no 'eyeball' steps;
5. small input changes should not cause discontinuous jumps in T (piecewise definitions are allowed, but should be noted).

`canons` package implements canons as *parametric* rules (explicit fractions), with an optional `guttermode=satzspiegel` that switches the operative frame from page P to leaf L by recomputing on $W_* = W - g$. The Honnecourt family is encoded algebraically (a constructive origin; an algebraic implementation). Diagnostics (`\pagecanoninfo`) expose the resulting T and margins regardless of presentation.

Related work and comparison. KOMA-Script [2] typearea chooses a typeblock via (`DIV`), (`BCOR`), and class-level heuristics sensitive to font details; canons fixes canonical ratios and shims the result through geometry. Use KOMA if you want class-integrated page design; use canons if you want literal canons.

memoir [3] class offers a comprehensive layout calculus (`\settypeblocksize`, `\setlrmargins`, diagnostics) and is a full publishing toolkit; if you want an end-to-end book class, memoir is the right hammer; canons is a small wrench: canons, gutters, marginalia.

tufte-book [1] class embodies a coherent editorial idiom going well beyond raw geometry: wide outer margins; sidenotes; specialized floats. canons can mimic the broad proportions, but does not, by itself, implement the idiom.

What sets canons apart. If you want *deterministic, reproducible* layouts from classical canons, with explicit control of marginalia and gutters, and you do *not* want a full class, use canons. If you want a comprehensive book-production framework, use memoir or KOMA-Script; if you want a curated editorial idiom, use tufte-book.

This package *implements* algebraic interpretations of several well-known canons. It does not claim historical finality: printers disagreed then; designers, now. We fix concrete proportional rules and apply them deterministically via geometry.

Some key features.

1. Given W, H and options, margins are fixed by explicit fractions, no heuristics.

2. Four modes (`symmetric`, `antisymmetric`, `right`, `left`) place margin material predictably whether you load `book`, `report`, or `article`.

3. Two gutter philosophies:

   (a) `guttermode=geometry`: text width is invariant in g, since `\textwidth` $= W - (\text{in} + \text{out})$ and we apply $+g$ to inner, $-g$ to outer; the sum is unchanged.

   (b) `guttermode=satzspiegel`: recompute on $W_* = W - g$.

4. cmdpagecanoninfo prints the resolved layout; exported lengths (`\marginandtext`, `\marginandsep`, `\fullwidthoverhang`, `\overflowingheadlen`) make margin-aware figures, rules, and floats routine, and are resolved at begin document.

5. Maintain class and geometry habits; canons only computes and applies the canon.

6. canons is built on geometry, and so we inherit geometry's utility and flexibility.

Why not just use geometry? You absolutely can! If you already know your exact margins, geometry is simpler; if you want canonical proportions and consistent marginalia defaults, canons saves you from re-deriving them. canons codifies common canons and keeps the side effects (marginalia, footskip) consistent; it is decidedly less powerful than memoir's full layout calculus, but more prescriptive than raw geometry.

Limitations. The canons package deliberately restricts itself to computing canonical page geometry. Users should be aware of the following limitations and situations where the package is not appropriate:

- layout is resolved once at `\AtBeginDocument`: the command `\pagecanonsetup` can adjust options mid-document, but recomputation is global, not page-by-page or chapter-by-chapter;

- the package does not manage line spacing or enforce a baseline grid, so for typographic grids, use a class or package designed for that task;

- not compatible with document classes that already manage page layout, such as memoir, tufte-book, or KOMA-Script (typearea); warnings are issued if such classes are detected;

- for Honnecourt and Ateliers variants, we express vertical margins as fractions of W (not H), coupling the text-block aspect to the paper aspect H/W; this is a defensible but contested reading of the historical constructions; we state it up front so we may disagree in good faith, and investigate consequences therein in the future.

- in `guttermode=geometry`, large binding allowances can collapse the outer margin to zero; a warning is issued in such cases; use `guttermode=satzspiegel` to preserve proportions;
- the package only computes and applies margins; it does not style headings, floats, front matter, running heads, or captions.

Use canons when you want canonical proportions with modern marginalia and gutter control that works with `article`, `book`, `report`. Avoid classes that already own page design.

3 Canons

Each canon is a *rule* (constructive or parametric) that maps a page/leaf rectangle and optional parameters to a textblock and margins. For this package: by default the operative frame is the *page* (`guttermode=geometry`); if `guttermode=satzspiegel` is selected, we recompute on the *leaf* width $W_* = W - g$ before mapping back.

Notation convention. Canon formulas below use W and H for page dimensions. When operating in leaf-frame mode (`guttermode=satzspiegel`), substitute $W_* = W - g$ for all W in horizontal calculations; vertical calculations use H unchanged. In the default page-frame mode (`guttermode=geometry`), $W_* = W$, and formulas apply directly.

3.1 Van de Graaf Canon

The Van de Graaf canon, named after Dutch book designer J.A. van de Graaf, represents a rediscovery of medieval manuscript proportions that appear consistently in incunabula and hand-copied texts from the 12th–16th centuries; this canon emerged from the analysis of Gothic and Renaissance manuscripts, revealing a remarkably consistent geometric construction.

The Van de Graaf construction begins with the fundamental insight that the text block should maintain the same proportions as the page itself. The construction proceeds as follows:

1. draw both diagonals of the full page spread (verso and recto together);

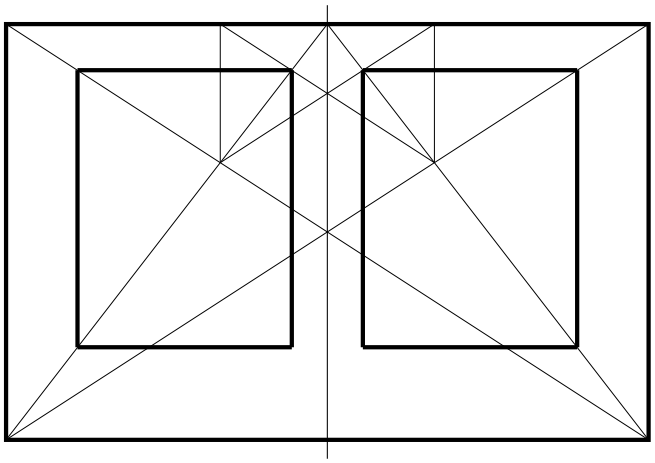

Figure 1: Van de Graaf canon; textarea shown with spread

2. draw the diagonal of a single page;

3. where the single-page diagonal intersects the spread diagonal determines the text block corner;

4. this intersection occurs at exactly 1/9 of the page width and height.

The 1/9 fractions are the outcome of the diagonal construction under the usual single-page-within-spread setup; other historical reconstructions exist. We emphasize the following point: the construction is primary and the fractions are derived; our implementation is the fractional codification.

For a page of width W and height H, the Van de Graaf canon produces:

- inner margin: $W/9$
- outer margin: $2W/9$
- top margin: $H/9$
- bottom margin: $2H/9$
- text width: $W - W/9 - 2W/9 = 6W/9 = 2W/3$
- text height: $H - H/9 - 2H/9 = 6H/9 = 2H/3$

For margin notes, we allocate:

- Marginpar width: $8W/45 \approx 0.178W$
- Marginpar separation: $W/45 \approx 0.022W$

This construction is codified and implemented here as

$$m_i = W/9,\ m_o = 2W/9,\ m_t = H/9,\ m_b = 2H/9$$

yielding

$$\texttt{\textwidth} = \tfrac{2}{3}W, \texttt{\textheight} = \tfrac{2}{3}H$$

We set $\texttt{footskip} = \frac{1}{2}m_{\text{bottom}}$. The diagonal construction is the *rule*; the fractions are its outcome. Once adopted, any grid divisible by 9 reproduces the block exactly.

3.2 Villard de Honnecourt Canon

Villard de Honnecourt was a 13th-century French architect whose sketchbook contains about 250 highly precise drawings, 74 of which are related to architecture, with the remaining including material naturalist places, characters, allegories, civil scenes, religious scenes, animals, machines, a veritable collection of technical knowledge and imagination. His canon (*canon de division harmonieuse* 'canon of harmonious division') uses recursive subdivision of the page, creating what we now recognize as a parametric family of layouts based on N-fold divisions.

We define $u = W/(N+3)$.

$$m_{\text{inner}} = u, \quad m_{\text{outer}} = 2u, \quad m_{\text{top}} = \tfrac{3}{2}u, \quad m_{\text{bottom}} = 3u.$$

Then $\texttt{\textwidth} = \frac{N}{N+3}W$ and $\texttt{\textheight} = H - \frac{9}{2}\frac{W}{N+3}$. Vertical margins depend on W, so the block aspect varies with H/W.

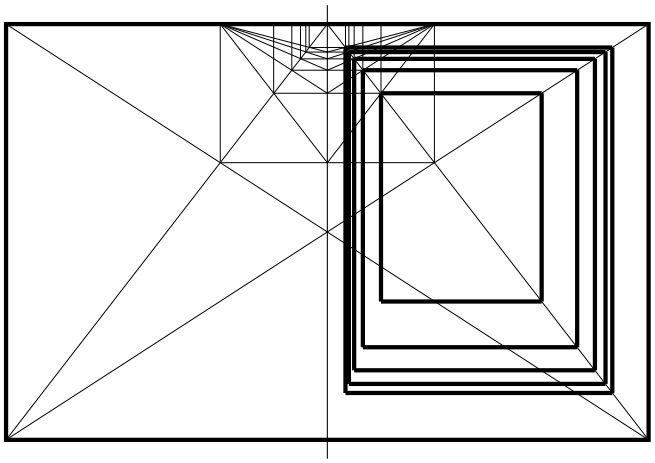

Figure 2: Honnecourt canon, with textareas drawn for each value of N; shown with spread

Because $m_{\text{top}}, m_{\text{bottom}} \propto W$, the textblock aspect depends on H/W. Exact recovery on an integer grid occurs only for special paper aspects. For $N = 6$, $u = W/9$:

- inner margin: $= W/9$
- outer margin: $= 2W/9$
- top margin: $= W/6$ (note: based on width, not height)
- bottom margin: $= W/3$

Vertical margins are determined by the page width, creating a unified geometric system. This produces different text block proportions than Van de Graaf while maintaining elegance. The N-parameter creates a family of related canons; configurations are given in Table 2.

N	**Inner**	**Outer**	**Top**	**Bottom**	**Margin space**
3	$W/6$	$W/3$	$W/4$	$W/2$	generous
6	$W/9$	$2W/9$	$W/6$	$W/3$	classic
9	$W/12$	$W/6$	$W/8$	$W/4$	moderate
12	$W/15$	$2W/15$	$W/10$	$W/5$	economic
15	$W/18$	$W/9$	$W/12$	$W/6$	compact

Table 2: Configurations for Villard de Honnecourt canon

Each subdivision maintains proportional relationships while adjusting the total margin space.

Vencentinus canon. Technically, by our parametric divisions, the case where $N = 3$ results in the division into 6, which Tschichold identifies as a method used by Marcus Vencentinus in the 15th-century for a prayer book; our Honnecourt canon subsumes this by our chosen N.

3.3 Tufte Canon

Edward Tufte's page design philosophy, articulated in his self-published books [7, 5, 8, 4, 6], prioritizes generous margins for annotations, figures, and marginalia. His canon represents a modern synthesis of classical principles with contemporary information design needs.

Tufte's approach derives from several principles:

1. wide margins accommodate figures without interrupting text flow;
2. multiple information streams coexist on the page;
3. deliberate asymmetry creates dynamic tension;
4. margins invite reader participation.

This is an algebraic house-style, not a medieval geometric canon. By construction: choose fixed horizontal and vertical fractions abstracted from Tufte-style layouts.

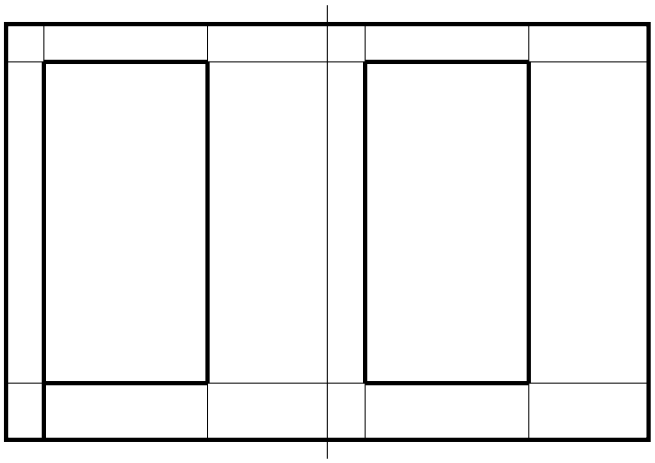

Figure 3: Tufte canon; textareas shown with spread

The ratios for this canon are derived directly from the tufte-latex document classes on letterpaper. As implemented here, the canon employs carefully chosen ratios:

- inner margin: $W/8.5 \approx 0.1176W$ (11.8% of page width)
- outer margin: $\approx 0.372941\,W$ (empirical from tufte-latex on letterpaper; not exactly 3/8)
- top margin: $H/11 \approx 0.0909H$ (9.1% of page height)
- bottom margin: $3H/22 \approx 0.1364H$ (13.6% of page height)
- text width: 50.9% of page width

Tufte's marginpar dimensions are optimized for readability:

- marginpar width: $4W/17 \approx 0.235W$ (23.5% of page width)
- marginpar separation: $W/26 \approx 0.038W$ (3.8% of page width)

The canonical Tufte layout exhibits strong asymmetry with extensive annotation space.

3.4 Canon des Ateliers

The *canon des ateliers* 'workshop canon' follows from French printing. Unlike single canonical proportions, this system provides three distinct styles.

1. **ordinary style** (*ordinaire*) maximizes text area while maintaining readability; used for educational texts, technical manuals; inner: $W/10$, outer: $3W/20$

2. **neater style** (*plus soigné*) balanced aesthetic for literary works; increased margins for improved readability; inner: $2W/15$, outer: $W/5$

3. **luxury** (*luxe*) generous margins for prestigious editions; maximum comfort and annotation space; inner: $3W/20$, outer: $9W/40$

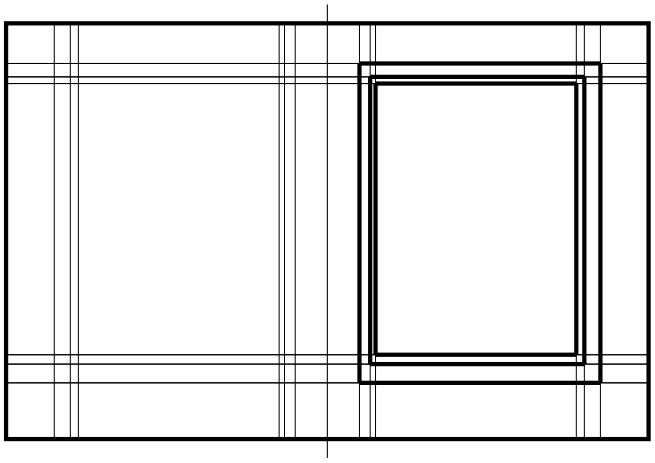

Figure 4: *canon des ateliers*, with textareas drawn for each style; shown with spread

The three styles follow a geometric progression in margin allocation. First, we define the textwidth:

$$\text{textwidth} = \begin{cases} \frac{3}{4}W & \text{(ordinary)}, \\ \frac{2}{3}W & \text{(neater)}, \\ \frac{5}{8}W & \text{(luxury)}. \end{cases}$$

What remains is whitespace:

$$\text{whitespace} = \begin{cases} \frac{1}{4}W & \text{(ordinary)}, \\ \frac{1}{3}W & \text{(neater)}, \\ \frac{3}{8}W & \text{(luxury)}. \end{cases}$$

Margins are fractions of the whitespace:

$$\text{inner, outer margins} = \begin{cases} \frac{4}{10}\,\text{whitespace} & \text{(inner)}, \\ \frac{6}{10}\,\text{whitespace} & \text{(outer)}, \end{cases}$$

$$\text{top, bottom margins} = \begin{cases} \frac{5}{10}\,\text{whitespace} & \text{(top)}, \\ \frac{7}{10}\,\text{whitespace} & \text{(bottom)}. \end{cases}$$

The three-tiered system likely follows from material and economic realities of printing. The choice of style was determined by several interrelated factors, including subject matter, print runs, material costs; luxury editions could afford to dedicate more page area to white space; a higher sale price offsets the cost of additional paper; better bindings, particularly the sewn bindings used for luxury editions, accommodates wider inner margins without compromising the text's visibility when the book was opened, while cheaper bindings necessitates narrower inner margins to ensure text near the spine remained readable.

3.5 Grid Canon

The Grid Canon represents a modern, systematic approach to page layout based on modular design principles popularized by the Swiss International Style and contemporary grid-based design. Unlike historical canons that derive from geometric construction or fixed proportions, the grid canon offers complete parametric control while maintaining the discipline of modular spacing. As such, the grid approach derives from several modern principles:

1. all spacing decisions align to a consistent grid;
2. margins are specified as integer multiples of a base unit;

3. the system scales predictably across different page sizes;

4. both symmetrical and asymmetrical layouts available.

The page is divided into an $N \times N$ grid of cells. For some integer $N \geq 3$, let $c_w = W_*/N$, $c_h = H/N$, where W_*, H are the operative dimensions ($W_* = W$ in page-frame mode, $W_* = W - g$ in leaf-frame mode). Choose integer cell counts (L, R, T, B) with $L + R < N$, $T + B < N$. Set margins

$$m_i = L\,c_w, \quad m_o = R\,c_w, \quad m_t = T\,c_h, \quad m_b = B\,c_h.$$

The text block is

$$\texttt{\textwidth} = (N - L - R)c_w, \qquad \texttt{\textheight} = (N - T - B)c_h.$$

By construction, for integers $L, R, T, B \geq 0$ with $L + R < N$ and $T + B < N$,

$$\frac{m_i}{W_*} = \frac{L}{N}, \qquad \frac{m_t}{H} = \frac{T}{N},$$

and the text–area fraction (relative to the operative frame $W_* \times H$) is

$$\frac{\texttt{\textwidth}}{W_*} \cdot \frac{\texttt{\textheight}}{H} = \Big(1 - \frac{L+R}{N}\Big)\Big(1 - \frac{T+B}{N}\Big).$$

The text-block aspect is

$$\frac{\texttt{\textheight}}{\texttt{\textwidth}} = \frac{N - T - B}{N - L - R} \cdot \frac{H}{W_*}.$$

If we want the area fraction relative to the original page $W \times H$; in `satzspiegel` mode $W_* = W - g$, yielding an extra factor $(W - g)/W$.

Verticals in the Grid canon are multiples of H/N, *not* fractions of W; therefore, the block's aspect depends on both H/W *and* the chosen cell counts, but not in the Honnecourt way. For a page of width W and height H with grid parameter N:

- cell width = W_*/N
- cell height = H/N

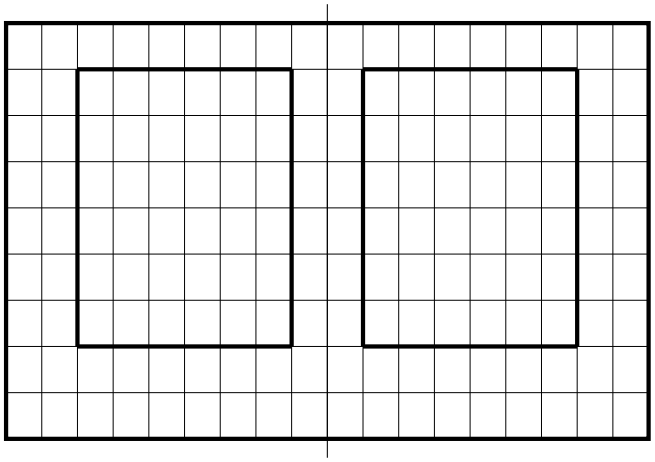

Figure 5: Grid canon for $N = 9$; textarea shown with spread

- inner margin = `gridinner` × cell width
- outer margin = `gridouter` × cell width
- top margin = `gridtop` × cell height
- bottom margin = `gridbottom` × cell height

Table 3 shows parameters and their default values as defined in canons, with a small description.

Parameter	Default	Range	Description
`gridN`	6	≥ 3	grid divisions ($N \times N$)
`gridinner`	1	$< N$	inner margin cells
`gridouter`	2*	$< N$	outer margin cells
`gridtop`	1	$< N$	top margin cells
`gridbottom`	2*	$< N$	bottom margin cells

Table 3: Grid canon parameters (*clamped to 1 when $N = 3$).

Table 4 shows some useful configurations that emerge from different parameter combinations.

Style	N	Inner	Outer	Top	Bottom	Character
Minimal	3	1	1	1	1	maximum text area
Classic	6	1	2	1	2	balanced proportions
Editorial	8	1	3	1	2	wide margin notes
Technical	12	1	2	2	3	documentation layout
Dense	12	1	1	1	2	maximized content

Table 4: Common grid configurations

While historical canons encode specific aesthetic judgments about proportion, the grid canon provides a framework for systematic decision-making. Van de Graaf, Villard de Honnecourt, and Canon des Ateliers all implicitly divide the page, they encode specific proportional relationships within those divisions. The grid canon exposes the division mechanism directly.

Van de Graaf as a special case. Van de Graaf is technically a special case, effectively a 9×9 grid, but with fixed allocations. The constructive ninths-with-diagonals lead to fractions

$$m_i/W_* = 1/9, m_o/W_* = 2/9, m_t/H = 1/9, m_b/H = 2/9$$

The grid canon recovers Van de Graaf canon *exactly* when N is a multiple of 9 and

$$L = \tfrac{N}{9},\ R = \tfrac{2N}{9},\ T = \tfrac{N}{9},\ B = \tfrac{2N}{9}.$$

If N is not divisible by 9, we get a best rational approximation in steps of $1/N$.

Aspect	Van de Graaf	Grid equivalent	Grid notation
Division	9×9 (implicit)	9×9 (explicit)	`gridN=9`
inner margin	$W_*/9$ (fixed)	1 cell	`gridinner=1`
outer margin	$2W_*/9$ (fixed)	2 cells	`gridouter=2`
top margin	$H/9$ (fixed)	1 cell	`gridtop=1`
bottom margin	$2H/9$ (fixed)	2 cells	`gridbottom=2`
text block	6×6 cells (fixed)	6×6 cells	Computed
user control	None	Full	All parameters

Table 5: Comparison of Van de Graaf canon and grid system

To reproduce Van de Graaf with the grid canon:

```
\usepackage[canon=grid, gridN=9, gridinner=1, gridouter=2, gridtop=1,
   gridbottom=2]{canons}
```

However, the grid canon allows variations Van de Graaf does not:

```
% Same 9×9 grid, but 1:3 horizontal ratio instead of 1:2
\usepackage[canon=grid, gridN=9, gridinner=1, gridouter=3]{canons}
```

Villard de Honnecourt's constrained system. Villard de Honnecourt's system uses the formula $u = W/(N + 3)$ with specific multipliers:

Villard N	Effective grid	Inner:Outer:Top:Bottom	Grid difference
$N = 3$	$W/6$ units	1 : 2 : 1.5 : 3	Non-integer verticals
$N = 6$	$W/9$ units	1 : 2 : 1.5 : 3	Width-based verticals
$N = 9$	$W/12$ units	1 : 2 : 1.5 : 3	Fixed proportions
$N = 12$	$W/15$ units	1 : 2 : 1.5 : 3	Always 1:2 horizontal

Table 6: Villard canon in terms of effective grids

Our Honnecourt family sets verticals as fractions of W: $m_t = \frac{3}{2}\,u$, $m_b = 3u$ with $u = W/(N + 3)$. The Grid canon fixes verticals in steps of H/N. Exact equality would require

$$T = \frac{N}{H} \cdot \frac{3}{2} \frac{W}{N+3} = \frac{3N}{2(N+3)} \cdot \frac{W}{H}, \qquad B = \frac{3N}{N+3} \cdot \frac{W}{H},$$

which are rarely integers unless the paper aspect W/H is specially tuned. Therefore, Grid $\rightarrow$ Honnecourt is generally an approximation (good, if N is large).

Canon des Ateliers' width-based approach. Ateliers divides total whitespace by fixed ratios:

Style	Text width	Whitespace	Distribution	Grid approximation
Ordinary	75%	25%	$0.4 : 0.6 : 0.5 : 0.7$	$N = 20$, cells: $2 : 3 : 2.5^* : 3.5^*$
Neater	66.7%	33.3%	$0.4 : 0.6 : 0.5 : 0.7$	$N = 15$, cells: $2 : 3 : 2.5^* : 3.5^*$
Luxury	62.5%	37.5%	$0.4 : 0.6 : 0.5 : 0.7$	$N = 16$, cells: $2.4^* : 3.6^* : 3 : 4.2^*$

Table 7: Non-integer values (*) show where the grid cannot exactly reproduce Ateliers

The Ateliers canon cannot be exactly reproduced with integer grid cells due to its fractional distributions; choose N and round.

Canon	Computation	Parameters	Flexibility
Van de Graaf	fixed fractions	0	none
Villard	formula with N	1 (value of N)	discrete (5)
Ateliers	whitespace split	1 (style)	discrete (3)
Grid	cell counting	5 (N + 4 margins)	continuous

Table 8: Comparison of classical and grid canons

Further comparisons The grid canon can reproduce some historical relationships exactly, approximate others, and create entirely new ones:

- Exact reproductions possible:
  - Van de Graaf with $N = 9$, margins 1:2:1:2
  - Simple ratios like 1:2, 1:3, 2:3
- Approximations only:

  - Honnecourt's 1.5:3 vertical ratio (needs $N = 6k$ for $k : 2k$ approximation)
  - Ateliers' 0.4:0.6 split (needs very large N)

- Novel configurations:
  - Asymmetric layouts (e.g., 1:4:2:1)
  - Golden ratio approximations with appropriate N
  - Fibonacci sequences in margins

The grid canon offers a superset of capabilities, in which we can match Van de Graaf and approximate others, adapt to usual page sizes without distortion, integrates with modular scales and grid frameworks, and adjusts individual margins without affecting others.

```
% Van de Graaf (no parameters)
\usepackage[canon=vdg]{canons}

% Villard (one parameter, constrained proportions)
\usepackage[canon=vdh, vdhN=6]{canons}

% Grid reproducing Van de Graaf exactly
\usepackage[canon=grid, gridN=9, gridinner=1, gridouter=2,
            gridtop=1, gridbottom=2]{canons}

% Grid with custom proportions impossible in historical canons
\usepackage[canon=grid, gridN=12, gridinner=1, gridouter=4,
            gridtop=2, gridbottom=3]{canons}
```

The grid canon thus provides both an analytical tool for understanding historical canons (by showing their implicit grid structure) and a practical tool for creating new layouts that would have been difficult to specify or construct using traditional geometric methods. Use the grid canon when you need explicit control over layout proportions, when working within a larger modular design system, or when historical proportions do not suit your content's needs.

4 Using canons

This section is practical. It shows how to install, load, configure, verify, and *use* the canons—what each choice means, what it buys you, and what to avoid. Examples are complete and copy-pastable.

4.1 Installation and prerequisites

Files. You need `canons.sty` and geometry. The package also uses calc, xparse, ifthen, etoolbox, pgfkeys, array (which are standard on modern TEX distributions).

Supported classes. `article`, `report`, `book` are fully supported. Do *not* combine canons with classes that already own the page-design calculus (e.g., `memoir`, `tufte-book`); pick one authority: no one can serve two masters.

4.2 Minimal "first page" checks

Choose a canon and show the frame.

```
\documentclass{book}
\usepackage[canon=vdg,showframe]{canons} % classical VdG with visible
    guides
\begin{document}
\pagecanoninfo % reports the resolved numbers in a small table
Hello world.
\end{document}
```

What you should see: outer/bottom margins larger than inner/top; `\pagecanoninfo` prints fractions and evaluated lengths.

One-sided with notes on the right (Tufte-style).

```
\documentclass{article}
\usepackage[canon=tufte,margins=right]{canons}
\begin{document}\reversemarginpar% <- remove if you want marginpars on
    the right by default
\marginpar{note} Main text...
\end{document}
```

Tip: with `margins=right`, the wide band is on the right; LaTeX places `\marginpar` on the outer side by default in two-sided mode and on the right in one-sided mode. Use `\reversemarginpar` to flip.

4.3 Paper size, orientation, and when the math runs

Order of operations. Paper size/orientation (via geometry) are established *before* canon math. canons computes *once* at `\AtBeginDocument`. Changing options later does not recompute automatically.

Examples.

```
% A4, two-sided book with binding allowance
\usepackage[canon=vdg,a4paper,margins=symmetric,gutterval=8mm]{canons}

% Landscape experimenting with width-based verticals (Honnecourt)
\usepackage[canon=vdh,vdhN=12,landscape]{canons}
```

4.4 Choosing a canon, with intent

Van de Graaf (`vdg`). Deterministic ninths: inner/top = 1/9 of width/height, outer/bottom = 2/9. Good for classical book pages. Exact recovery on a modular grid when $N = 9k$.

Villard de Honnecourt (`vdh`, $N \in \{3, 6, 9, 12, 15\}$). Width-based verticals: $u = W/(N+3)$;$m_i = 1u$, $m_o = 2u$, $m_t = 1.5u$, $m_b = 3u$. Block aspect varies with H/W. Use when you want a historically flavored, compact type area.

Tufte (`tufte`). Asymmetric house style with a wide outer notes band. Use for note-heavy writing.

Ateliers (`ateliers`). Three styles (ordinary/neater/luxury). Vertical margins as W-fractions. Use to dial generosity without changing the idiom.

Grid (`grid`). Discrete $N \times N$ lattice; set integer margin counts L, R, T, B. Use when you need modular alignment or to approximate VdG/Honnecourt with quantized steps.

4.5 Binding gutters

`guttermode=geometry` (preserve text width). We add $+g$ to inner and $-g$ to outer; `\textwidth` is unchanged. Large g can collapse the outer margin to zero.

`guttermode=satzspiegel` (preserve proportions). We recompute the canon on $W_* = W - g$ and then add $+g$ to the inner margin. `\textwidth` shrinks by the canon's horizontal text fraction α: $\alpha = 2/3$ (vdg), $\alpha = N/(N+3)$ (vdh), $\alpha \approx 0.509412$ (tufte), $\alpha = k$ (ateliers), $\alpha = (N-L-R)/N$ (grid).

Practical recipes.

```
% Keep copyfit identical before/after binding
\usepackage[canon=vdg,gutterval=10mm,guttermode=geometry]{canons}

% Keep proportions canonical even after binding
\usepackage[canon=vdg,gutterval=10mm,guttermode=satzspiegel]{canons}
```

4.6 Margin placement semantics

Two-sided defaults. `book`/`report` default to `symmetric`: outer notes, inner binding. Two-sided classes put marginpars outer by default; one-sided puts them right unless reversed.

Options.

- `symmetric`: standard recto/verso alternation; notes on the outer edge.
- `antisymmetric`: swap inner/outer; notes near the binding (sets `reversemarginpar`).
- `right`/`left`: one-sided layouts; sets `asymmetric`.

4.7 The Grid canon: how to choose number of cells

Cell math. With $N \geq 3$: $c_w = W_*/N$, $c_h = H/N$. Choose $L, R, T, B \geq 0$ with $L + R < N$, $T + B < N$. Then:

$$\frac{m_i}{W_*} = \frac{L}{N}, \qquad \frac{m_t}{H} = \frac{T}{N}, \qquad \frac{\text{area}(T)}{W_* H} = \left(1 - \frac{L+R}{N}\right)\left(1 - \frac{T+B}{N}\right).$$

Exact VdG via Grid. Pick $N = 9$ and $(L, R, T, B) = (1, 2, 1, 2)$ (or any $N = 9k$ with counts scaled by k).

Approximating Honnecourt. Honnecourt verticals step in $W/(N{+}3)$; Grid steps in H/N. Match requires special H/W:

$$T \approx \frac{3N}{2(N+3)} \frac{W_*}{H}, \quad B \approx \frac{3N}{(N+3)} \frac{W_*}{H},$$

then round to integers and check `\pagecanoninfo` for the error.

Examples.

```
% Pure modular: 6x6 grid, simple 1:2:1:2 margins
\usepackage[canon=grid,gridN=6,gridinner=1,gridouter=2,gridtop=1,
   gridbottom=2]{canons}

% Exact VdG, but on a finer lattice
\usepackage[canon=grid,gridN=18,gridinner=2,gridouter=4,gridtop=2,
   gridbottom=4]{canons}
```

4.8 Reading `\pagecanoninfo`

`\pagecanoninfo` returns a compact table with: (i) the algebraic factors (e.g., $W/9$); (ii) resolved lengths in document units; (iii) margin-note widths/separations; (iv) text block size. The Grid canon table also shows N, counts, and cell size. Example:

Van de Graaf Canon

Dimension	Factor	Value	Fraction
Inner margin	$W/9$	68.25708pt	1/9
Outer margin	$2W/9$	136.51416pt	2/9
Top margin	$H/9$	88.33269pt	1/9
Bottom margin	$2H/9$	176.66537pt	2/9
Text width	$6W/9$	409.52376pt	2/3
Text height	$6H/9$	529.97192pt	2/3
Marginpar width	$8W/45$	109.20946pt	8/45
Marginpar sep	$W/45$	13.64766pt	1/45

Page: 614.295pt (W) × 794.96999pt (H)
Margin mode: **right**
Gutter: 0.0pt (geometry mode)
Footskip: 88.33269pt
Margin+text: 532.38087pt
Margin+sep: 122.85712pt
Fullwidth overhang: 122.85712pt

4.9 Mid-document changes (what is and is not supported)

canons computes once. Switching canons mid-document is out of scope: there is no public 'recompute now' command. Change `margins=` mid-document by calling `\newgeometry` and `\restoregeometry`. If you need per-chapter layouts: split the work into multiple documents/classes, or own the geometry calls directly.

4.10 Troubleshooting and diagnostics

These encompass errors encountered or anticipated. This section is likely to change frequently over time.

Frames look wrong. Turn on `showframe`. Confirm paper size and orientation. Then print `\pagecanoninfo` and compare the declared fractions to measured lengths.

Outer margin is tiny or negative. You probably selected a large `gutterval` with `guttermode=geometry`. Either reduce g or switch to `satzspiegel`.

Grid errors. Counts must obey $L + R < N$, $T + B < N$. At $N = 3$, defaults normalize to 1:1 both axes.

Headers/footers collide. canons sets `\footskip` to $\frac{1}{2}m_b$. If you use fancyhdr/`scrlayer-scrpage`, adjust their parameters *after* canons so header/foot rules do not accidentally trespass.

KOMA classes complain about geometry.

4.11 Common documents

Classical two-sided book with binding.

```
\usepackage[canon=vdg,margins=symmetric,gutterval=8mm]{canons}
```

Notes-heavy report (one-sided).

```
\usepackage[canon=tufte,margins=right,letterpaper]{canons}
```

Compact textbook on A4.

```
\usepackage[canon=vdh,vdhN=12,margins=symmetric,a4paper]{canons}
```

Luxury display pages.

```
\usepackage[canon=ateliers,ateliersstyle=luxury]{canons}
```

VdG via Grid.

```
\usepackage[canon=grid,gridN=9,gridinner=1,gridouter=2,gridtop=1,
   gridbottom=2]{canons}
```

4.12 Exported lengths

Name	Meaning
`marginandtext`	`textwidth` + `marginparsep` + `marginparwidth`
`marginandsep`	`marginparsep` + `marginparwidth`
`fullwidthoverhang`	equals `marginandsep`
`overflowingheadlen`	`textwidth` + `marginandsep`
`canonsmargins`	expands to `symmetric`/`antisymmetric`/`right`/`left`

Example use (header rule across notes band).

```
\makeatletter
\renewcommand\headrule{%
  \hrule \@height 0.4pt \@width \overflowingheadlen \vskip-0.4pt}
\makeatother
```

References

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[7] E.R. Tufte. *The Visual Display of Quantitative Information*. Graphics Press, 2001. ISBN: 9781930824133.

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A Package details

Frames, symbols, order

$$W = \texttt{\textbackslash paperwidth}, \quad H = \texttt{\textbackslash paperheight}, \quad W_* = \begin{cases} W & \text{(default)} \\ W - g & \text{if } \texttt{guttermode=satzspiegel} \end{cases}$$

Order: (1) paper → (2) canon → (3) gutter mode → (4) margin mode → (5) export lengths.

Canon summaries (as implemented)

Van de Graaf (vdg).

$$m_i = \tfrac{W_*}{9}, \quad m_o = \tfrac{2W_*}{9}, \quad m_t = \tfrac{H}{9}, \quad m_b = \tfrac{2H}{9}.$$

$\texttt{\textbackslash textwidth} = \frac{2}{3}W_*$, $\texttt{\textbackslash textheight} = \frac{2}{3}H$. Not centered; outer/bottom > inner/top.

Villard de Honnecourt (vdh, $N \in \{3, 6, 9, 12, 15\}$).

Let $u = W_*/(N + 3)$.

$m_i = 1u$, $m_o = 2u$, $m_t = 1.5u$, $m_b = 3u$, $\texttt{\textbackslash textwidth} = W_* - 3u = \frac{N}{N+3}W_*$, $\texttt{\textbackslash textheight} = H - 4.5u$.

Verticals depend on $W_* \Rightarrow$ block aspect varies with H/W.

Tufte (tufte).

$$m_i \approx \tfrac{2}{17}W, \quad m_o \approx \tfrac{3}{8}W \text{ (code } 0.372941W), \quad m_t = \tfrac{H}{11}, \quad m_b = \tfrac{3H}{22}.$$

$\texttt{\textbackslash textwidth} \approx 0.509412\,W$. Notes band: $\texttt{marginparwidth} \approx \frac{4}{17}W$, $\texttt{marginparsep} \approx \frac{1}{26}W$.

Canon des Ateliers (ateliers). Verticals are fractions of W. With $k \in \{\frac{3}{4}, \frac{2}{3}, \frac{5}{8}\}$ (ordinary/neater/luxury), $w = (1 - k)W$:

$$m_i = 0.4w, \quad m_o = 0.6w, \quad m_t = 0.5w, \quad m_b = 0.7w,$$

so explicitly:

ordinary: $(m_i, m_o, m_t, m_b) = (\frac{1}{10}, \frac{3}{20}, \frac{1}{8}, \frac{7}{40})W$
neater: $(\frac{2}{15}, \frac{1}{5}, \frac{1}{6}, \frac{7}{30})W$
luxury: $(\frac{3}{20}, \frac{9}{40}, \frac{3}{16}, \frac{21}{80})W$

$\texttt{\textbackslash textwidth} = kW$. Aspect varies with H/W.

Grid (grid). Pick $N \geq 3$. Cell size $c_w = W_*/N$, $c_h = H/N$. Choose integers $L, R, T, B \geq 0$ with $L{+}R < N$, $T{+}B < N$:

$$m_i = Lc_w, \quad m_o = Rc_w, \quad m_t = Tc_h, \quad m_b = Bc_h,$$

$$\texttt{\textwidth} = (N{-}L{-}R)c_w, \qquad \texttt{\textheight} = (N{-}T{-}B)c_h.$$

Area fraction (relative to $W_* \times H$):

$$\frac{\texttt{\textwidth}}{W_*} \cdot \frac{\texttt{\textheight}}{H} = \left(1 - \tfrac{L+R}{N}\right)\left(1 - \tfrac{T+B}{N}\right).$$

Notes. VdG if N multiple of 9 and $(L, R, T, B) = (N/9, 2N/9, N/9, 2N/9)$. Honnecourt is generally approximated (Grid verticals step in H/N, Honnecourt in $W_*/(N{+}3)$).

Footers. Default `footskip` $= \frac{1}{2}m_b$ (all canons).

Gutter modes (binding allowance g)

`geometry`	$\text{inner}_{\text{final}} = m_i + g$, $\text{outer}_{\text{final}} = m_o - g$. Preserves `\textwidth`; may clamp outer to 0 if g is large.
`satzspiegel`	Compute canon on $W_* = W - g$, then add $+g$ to inner. Preserves proportions; Δ`\textwidth` $= -\alpha\, g$ with $\alpha = \frac{2}{3}$ (vdg), $\frac{N}{N+3}$ (vdh), ≈ 0.509412 (tufte), k (ateliers), $\alpha = \frac{N-L-R}{N}$ (grid).

Margin modes (placement semantics)

Mode	Geometry flags	Effect
`symmetric`	(default)	Two-sided; notes on outer edge
`antisymmetric`	`reversemarginpar`	Two-sided; notes on inner edge
`right`	`asymmetric`	One-sided; notes on right
`left`	`asymmetric`	One-sided; notes on left

Table 9: Placement of margins

Diagnostics and exports

- `\pagecanoninfo`: prints factors and evaluated lengths.
- `\canonsmargins`: expands to current margin mode token.
- Exported lengths: `\marginandtext`, `\marginandsep`, `\fullwidthoverhang`, `\overflowingheadlen`.
- `\showframe` (via geometry) and `\debug` (log trace).

Quick checks

- **VDH/Ateliers verticals** depend on W_* ⇒ block aspect varies with H/W.
- **Large gutter + `geometry`** can zero the outer margin; prefer `satzspiegel`.
- **Grid constraints** $L{+}R < N$, $T{+}B < N$; VdG needs $N \equiv 0 \pmod 9$.
- **Continuity** Canon recomputation is at `\AtBeginDocument`; change paper first.

Minimal recipes

```
% Classic book
\usepackage[canon=vdg, margins=symmetric, gutterval=8mm]{canons}

% Notes-heavy single-sided
\usepackage[canon=tufte, margins=right, paper=letterpaper]{canons}

% Economical textbook
\usepackage[canon=vdh, vdhN=12, paper=a4paper]{canons}

% Luxury display
\usepackage[canon=ateliers, ateliersstyle=luxury]{canons}

% Exact Van de Graaf via Grid
\usepackage[canon=grid, gridN=9, gridinner=1, gridouter=2, gridtop=1,
   gridbottom=2]{canons}
```

Options and defaults table

Key	Default	Values	Notes
`canon`	`vdg`	`vdg|vdh|tufte|ateliers|grid|false`	core selector
`margins`	class-dep.	`symmetric|antisymmetric|right|left`	`book`/`report` → `symmetric`; `article` → `right`
`gutterval`	`0mm`	dimension	binding allowance
`guttermode`	`geometry`	`geometry|satzspiegel`	`geometry` preserves `\textwidth`; `satzspiegel` recomputes on $W_* = W - g$
`paper`		any geometry value	forwarded to geometry
`showframe`	off	boolean	forwarded to geometry
`landscape`	off	boolean	forwarded to geometry
`debug`	off	boolean	emits `PackageInfo` diagnostics

Table 10: Core options and defaults

Key	Default	Values	Notes
`vdhN`	`6`	`3,6,9,12,15`	verticals are fractions of width W_* (declared bias) `footskip` $= \frac{1}{2}m_{\text{bottom}}$; marginpars N-dependent

Table 11: Honnecourt family controls

Key	Default	Values	Notes
`ateliersstyle`	`ordinary`	`ordinary|neater|luxury`	Verticals are width-based; textwidth kW_* with $k \in \{\frac{3}{4}, \frac{2}{3}, \frac{5}{8}\}$. `footskip` $= \frac{1}{2}m_{\text{bottom}}$; marginpars style-dependent

Table 12: Ateliers style control

Key	Default	Values	Notes
`gridN`	`6`	integer ≥ 3	at $N = 3$, defaults normalize to 1:1 horiz/vert*
`gridinner`	`1`	$0 \ldots N-1$	inner margin (cells)
`gridouter`	`2`	$0 \ldots N-1$	outer (cells); clamps to `1` at $N = 3$*.
`gridtop`	`1`	$0 \ldots N-1$	top (cells)
`gridbottom`	`2`	$0 \ldots N-1$	bottom (cells); clamps to `1` at $N = 3$* `footskip` $= \frac{1}{2}m_{\text{bottom}}$; marginpars heuristic: `sep` $\approx$ cell/6 with floors

Table 13: Grid parameters; *only if user leaves defaults intact at $N = 3$

Interface	Type	Notes
`\pagecanoninfo`	command	prints resolved canon, margins, `\textwidth`/`\textheight`, marginpars, gutter, exports
`\pagecanonmargins`	macro	expands to current margin mode token
`\pagecanonsetup{...}`	command	re-applies layout after changing keys; guarded against recursion
`\marginandtext`	length	`textwidth` + `marginparsep` + `marginparwidth`
`\marginandsep`	length	`marginparsep` + `marginparwidth`
`\fullwidthoverhang`	length	equals `\marginandsep`
`\overflowingheadlen`	length	`textwidth` + `marginandsep`
Compute time		Single pass at `\AtBeginDocument`; `\pagecanonsetup` re-applies globally (no per-page recompute)
Conflicts		Warns for `memoir`/KOMA and `twocolumn`; let one system own layout

Table 14: Public interface and exported lengths