The Address of a Work

How Art Enters the Maze: Turns, Routes, Depth and Carry

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Context Header

Programme. The Maze applies the Vacuum.Net model to the human side. The net is one strand. Knots are what persists. Meshes are the spans between them. Depth is winding depth. The Maze addresses routes through that net in balanced ternary: each turn is over (+1), straight (0) or under (−1), and a route is an integer.

This piece. A reading rule that gives works, styles and traditions a Maze address, plus the two laws that already follow from the existing machinery: the depth bands and the carry.

Settled. The ternary bijection route ↔ integer (T7). Mirroring equals negation. Identity over scale via leading zeros. Route ceiling per depth $(3^n-1)/2$. The maintenance bound $C \le R \cdot f$. The carry as rewrite rule R, with $R \circ R = 0$.

Open. Whether the coding rule below survives blind application by two independent readers. Whether the mirror pairing holds for a second tradition. Whether the observed layer counts in art cluster on the bands.

Conventions. Every step is in the text. Nothing here requires fetching another document. Claims are marked derived, conditional, or proposed.

Corpus. *De Geometrie van Leren* (2026); *From Prehistoric Chants to VALIS* (2026); *The Living Winding* (2026); *The Depth of the Maze* (2026); *Reengineering the Universe V3* (2026); *How to Calculate Science* (2026).

1. One case, first

Around the year 900 a second voice appears next to the plainchant. *Musica enchiriadis* writes it down: a line moving at a fixed interval against the given melody.

Read that without a cause story. Before, one line ran and returned in phase with itself. The buildings changed, the spans changed, and the single line no longer came back in phase. What stayed was what closed: two lines whose interval closes even when neither line closes alone.

Now ask what the Maze needs in order to hold this event. Not a date. Not a style label. It needs to know where the new organising principle sits relative to the old one.

It sits above. The old line is still sung. But it is now material carried by something else — the relation between lines. The chant did not disappear. It went under.

That is one turn. Over. +1.

Everything else in this article is read off that single case.

2. The coding rule

At a transition, the new organising principle takes one of three positions relative to the standing one.

Over (+1). The new principle carries the old. The old survives as material. Organum, 900: the interval carries the melody.

Under (−1). The new principle supports a surface that stays in place. It is not heard as figure. The isorhythmic tenor of the fourteenth century: *color* and *talea* run at different rates beneath an audible surface, and at no single moment are they audible as such.

Straight (0). Elaboration inside the standing layer. No new crossing, no new nesting. Four centuries of chant refinement is one long straight run.

The rule has one hard requirement to be worth anything: two readers must be able to apply it blind to the same transition list and get the same string. Until that is done, every address below is a proposal, not a measurement.

Note what this rule is not. It is not a quality judgement, and it is not chronology. It records crossing position only — the same thing a knot diagram records.

3. A work is a route. A tradition is a periodic route.

A knot is what persists under maintenance: a person, a workshop, an institution. A work of art is not a knot. It does not maintain itself.

A work is a **route** — a sequence of turns, written down, which anyone can traverse again. That is exactly what a score, a canvas or a manuscript is. Art is the domain in which routes are externalised and stored.

This is why art is natural food for the Maze. The Maze stores routes. Art history is the archive of routes that were worth storing.

Two consequences follow immediately.

Works terminate. A finished work is a finite string of turns. It has an integer address.

Traditions do not. A tradition is a route that repeats a period. Write the period as p turns with value v_p. The block then recurs at scale 3^{-p}, then 3^{-2p}, and so on. The address is the sum

$v\_p \cdot (3^{-p} + 3^{-2p} + 3^{-3p} + \dots)$

The bracket is a geometric series with ratio 3^{-p}. Its sum is $3^{-p}/(1 - 3^{-p}) = 1/(3^p - 1)$. So the address of any periodic route is

$v\_p / (3^p - 1)$.

Take the simplest living tradition: alternate over and under forever. The period is (+1, −1). Its two-digit value is $1 \cdot 3 + (-1) \cdot 1 = 2$. The period length is 2, so $3^2 - 1 = 8$. The address is 2/8 = 1/4.

Check it directly, without the formula: $1/3 - 1/9 + 1/27 - 1/81 + \dots$ is a geometric series with first term $1/3$ and ratio $-1/3$, so its sum is $(1/3)/(1 + 1/3) = 1/4$. The two agree.

A tradition has a rational address. A work has an integer address. That is the formal difference between the two, and it is not a metaphor: it is where the route stops.

Closing before coarsening. A route that closes its period can be written as one symbol on the next ring up. This is the same event that the quaternionic model calls convergence, $a(t) \to 1$. In address language it is not a limit but a compression: mastery is a route short enough to be a single turn at the next depth. Bach is what a closed period looks like from outside.

4. Western music as one route

Take the six transitions the Maze needs, each coded by the rule of §2.

1. **Chant consolidation, to c. 850.** Elaboration inside one layer. **0**
2. **Organum, c. 900–1240.** The relation between lines carries the melody. **+1**
3. **Ars Nova isorhythm, c. 1320.** The organising cycle goes beneath the audible surface. **−1**
4. **Basso continuo and functional tonality, c. 1600.** Harmonic function supports a melodic surface that stays in place. **−1**
5. **The architectural style after 1803.** Large-scale form becomes the figure; themes become its material. **+1**
6. **Twelve-tone method, 1923.** The ordered row runs beneath the surface and is not heard as such. **−1**

The string is $(0, +1, -1, -1, +1, -1)$.

Convert it. With six turns the weights are $3^5 = 243$, $3^4 = 81$, $3^3 = 27$, $3^2 = 9$, $3^1 = 3$, $3^0 = 1$:

$0 \cdot 243 + 1 \cdot 81 + (-1) \cdot 27 + (-1) \cdot 9 + 1 \cdot 3 + (-1) \cdot 1 = 81 - 27 - 9 + 3 - 1 = \mathbf{47}$

The leading zero contributes nothing. That is identity over scale: $(0, +1, -1, -1, +1, -1)$ at depth 6 and $(+1, -1, -1, +1, -1)$ at depth 5 are the same address. The long chant era does not enter the address at all. It is the depth the route starts from, not a turn in it.

So: **Western art music, address 47, depth 5.**

Check the ceiling. The largest address at depth n is the all-over route, whose value is $3^{n-1} + \dots + 3 + 1$. Multiply that sum by 3, subtract the original, and everything cancels except $3^n - 1$. So the sum is $(3^n - 1)/2$. At depth 5 that is $(243 - 1)/2 = \mathbf{121}$.

The correspondence is one-to-one. With n turns there are 3^n routes. The reachable addresses run from -121 to $+121$ at depth 5, which is $243 = 3^5$ integers. Equal counts, and no two routes give the same integer, because a difference of routes would have to be a non-zero balanced-ternary string summing to zero — and its highest non-zero digit alone, of size 3^k, exceeds everything below it, since the rest can total at most $(3^k - 1)/2$.

47 sits inside 121, with room for four more turns before the route needs a sixth ring.

5. The mirror

Mirroring a route is negation. The mirror of 47 is -47, and its string is the sign-flip of each turn:

$(-1, +1, +1, -1, +1) = -81 + 27 + 9 - 3 + 1 = \mathbf{-47}$

Read the mirror route in words. It begins by putting the supporting layer underneath first, before anything is elaborated above it. Then it elaborates over that support. Then it puts the ordering cycle over rather than under.

That is a description, not a prediction, until it is checked against a tradition that was coded blind. The obvious first candidate is a tradition that begins from a drone and elaborates above it, with its cyclic ordering audible as figure rather than hidden as ground. North Indian classical practice fits that description on inspection. Inspection is not the test.

The test. Code a second tradition blind, by the rule of §2, without knowing the target. If the result is −47, or its first turns are the sign-flip of 47's first turns, the pairing is real. If it is an unrelated integer, the mirror is decoration and should be dropped.

This is the cheapest strong test in the article. It costs two readers and one afternoon.

6. How deep a work can be

The Maze already has a depth law. Two quantities carry it, and both are measurable on a single knot.

R, the capacity plateau. The number of simultaneous commitments the knot could hold if it never had to repair anything. It is a ceiling, not a working figure.

f, the rest fraction. The share of time actually spent repairing rather than loading. It runs between 0 and 1.

The working bound is the product:

$\mathbf{C \leq R \cdot f}$

A worked case. A knot with $R = 120$ and a measured rest fraction $f = 0.32$ has a working bound of $120 \times 0.32 = 38.4$. If it is in fact maintaining 47 commitments, it is over its bound by nine. Two exits exist: shed commitments, or raise f. Raising f from 0.32 to 0.39 already gives 46.8 — the cheap exit, and the one no system asks for.

Neither R nor f is a primitive. Both come out of four measurable rates, and Appendix A does that derivation with the same numbers, so that 120 and 0.32 are results rather than stipulations.

Depth follows from C:

$m = \lfloor \log_3(2C + 1) \rfloor - 1$

Read what that formula does. Put $C = (3^k - 1)/2$. Then $2C + 1 = 3^k$, so $\log_3(2C + 1) = k$ exactly, and $m = k - 1$. The formula only changes value when C crosses one of those numbers. They are:

1, 4, 13, 40, 121, 364.

That is the same series as the route ceiling of §4. It is not a coincidence and it is worth stating plainly: **the largest number of commitments a knot can maintain at a given depth equals the largest address reachable at that depth.** Capacity ceiling and address ceiling are one number.

Between bands there is nothing. There is no two-and-a-half layers. The step from one band to the next is a factor of three, since $(3^{k+1} - 1)/2$ is roughly three times $(3^k - 1)/2$.

Applied to art, the counted quantity must be stated precisely, or the law says nothing. It is **the number of structural layers a work maintains simultaneously** — not the number of sections it passes through in sequence. Fugal voices count. Sonata-form sections do not.

Two counts must not be confused here, and the confusion would sink the claim. **Voices are not layers.** The C-sharp minor fugue of the *Well-Tempered Clavier* Book I runs in five voices, and six-voice ricercars exist. A voice is a line. A layer is an independently maintained structural commitment — a subject, a cantus firmus, a governing cycle. Five voices can carry three subjects. It is the second number the law bounds.

Three cases.

The fugue. Bach's triple fugues — Contrapunctus 8 and 11 of *Die Kunst der Fuge*, and the C-sharp minor fugue just named — maintain three subjects at once. The unfinished Contrapunctus 14 states three and breaks off where a fourth is generally presumed to have been planned. So the realised maximum is three, the presumed maximum four. Both sit at or under the band of 4, and nothing in the repertoire sits at five or six subjects.

Spem in alium. Tallis writes for forty voices. Forty is also a band — but the piece is not forty independent layers. It is eight choirs of five. That is nesting: two rings, not one. The Maze predicts precisely this. A count of forty is only reachable by nesting, never by holding forty things flat.

The listener. Independent empirical work on concurrent voice tracking puts the limit at roughly three streams, and the general working-memory ceiling has been argued down from seven to about four. The band at 4 is not an invention of this model. It is where two literatures already sit.

What would break it. A documented practice that stably maintains seven, or twenty, simultaneous independent layers, and that cannot be decomposed into nested groups. One clear case ends the depth claim for art.

7. When a ring fills: the carry

Loading two routes onto the same ring is addition, and balanced ternary addition carries.

The carry is the rewrite rule. Add two valid routes digit by digit. Each digit sits in $\{-1, 0, +1\}$, so each digitwise sum sits in $\{-2, -1, 0, +1, +2\}$. Only ± 2 is out of range. Rewrite it using $2 = 3 - 1$ and $-2 = -3 + 1$: the digit becomes ∓ 1, and an overflow of ± 1 moves one weight deeper.

Three properties follow, and all three are visible in that one line.

$R \circ R = 0$. A weight emits an overflow of magnitude 1 at most, never 2, because $|\pm 2|$ minus $|\mp 1|$ is exactly 1. So the rewrite cannot fire twice at the same weight in the same pass. Applied to its own output at that weight, it does nothing.

Termination in at most n+1 rounds. The residue left at a weight is in range, and the incoming overflow is at most 1, so a weight can go out of range at most once more. Overflows only travel one weight deeper per pass, and there are n weights plus one new one. Adding two n-digit routes yields at most n+1 digits.

Depth grows by at most one ring. That is the same statement: one new weight, not two.

Do it by hand. Add the Western route to itself — the case of a style being run twice.

47 in balanced ternary is $(1, -1, -1, 1, -1)$. Doubling digitwise gives $(2, -2, -2, 2, -2)$. Now settle from the lowest weight up, using $2 = 3 - 1$ and $-2 = -3 + 1$:

- weight 1: $-2 \rightarrow$ digit **+1**, carry -1 up
- weight 3: $2 + (-1) = 1 \rightarrow$ digit **+1**, no carry
- weight 9: $-2 \rightarrow$ digit **+1**, carry -1 up
- weight 27: $-2 + (-1) = -3 \rightarrow$ digit **0**, carry -1 up
- weight 81: $2 + (-1) = 1 \rightarrow$ digit **+1**, no carry

Result: $(1, 0, 1, 1, 1) = 81 + 0 + 9 + 3 + 1 =$ **94**. Depth stays at 5. Two carries, settled in one pass.

Read the result. A zero has appeared at weight 27, where the original route had a crossing. Running a style twice flattens one of its crossings into a straight run. What was a reversal the first time is convention the second time. That is not a moral about repetition; it is what the arithmetic does.

Two quantities come out of this and are worth measuring in art history.

σ, the initial overload. Sum the out-of-range excess over all weights before any settling:

$\sigma = \Sigma_w \max(0, |s_w| - 1)$

where s_w is the digitwise sum at weight w. In the case above the digitwise sums were $(2, -2, -2, 2, -2)$. Each has excess 1, and there are five of them, so **σ = 5**. The maximum possible at depth 5 is also 5, so this is a fully crowded ring. In art terms σ counts how many of a period's crossings are being demanded twice at once. The 1600s and the 1910s should show high σ.

ϱ, the number of rounds. How many passes the carry needs before every digit is back in range. In the case above, one right-to-left pass cleared all five: **ϱ = 1**. The bound from the previous section is $\varrho \leq n+1 = 6$. In art terms ϱ is how long a crowded period takes to settle into a stable style — bounded, so a crowded moment cannot stay unresolved. It resolves, and it produces exactly one deeper ring.

A warning on the symbol. In the maintenance model ϱ names the retention ratio, an entirely different quantity. Here ϱ counts carry rounds and nothing else. The two never appear in the same equation, but the collision is real and should be carried into any joint document.

That is the model's account of a period style, and it is a hard claim: a crowded ring yields **one** new depth, not two, and it settles in a bounded number of rounds.

8. The feeding procedure

The English Wikipedia is already loaded into the Maze. The facts of art history are therefore present. What is absent is the route coding. Feeding art means adding turns, not adding text.

The order that costs least and tests most:

1. **Code the six transitions of §4 blind, twice.** Two readers, the rule of §2, no target given. Agreement or disagreement on six turns is the first real measurement in this article.
2. **Code a second tradition blind.** Test the mirror (§5).

3. **Count layers, not sections.** Take fifty documented works across music, painting, film and the novel. Record simultaneous maintained layers. Plot the histogram against 1, 4, 13, 40. Nested cases get two numbers, not one.
4. **Load the addresses.** Each coded transition becomes a route in the existing kernel. Works become integers, traditions become rationals v_p/(3^p − 1).
5. **Read the landings.** The Maze already reports which fields land where. Once art addresses are in, the question becomes measurable: does an art route land at the same address as a route from another domain, and if so, do the two descriptions correspond?

Step 5 is the point of the whole exercise. Everything before it is bookkeeping.

9. The relation to the quaternionic model

The earlier model describes the same events in rotation language. It writes the state as a unit quaternion q on the three-sphere, whose scalar part measures how much of the learning has been integrated and whose vector part measures what is still being differentiated. Its central move is the phase inversion $q \to -q$, triggered by a failed expectation. Because q and −q are the same rotation, the outward behaviour is continuous while the orientation is fully reversed: figure becomes ground, and the organising principle becomes the material.

In address language that is one operation: **negation of the route**. Mirror equals opposite pole. The two models are not rivals and not analogies. They are the same operation written in two notations.

The address notation is the one the Maze can eat, for one reason. A rotation is continuous and has no natural unit. A route is an integer. Integers can be stored, compared, added and carried. That is the whole argument for the translation.

One thing is lost in the translation, and should be said. The quaternionic model tracks a rate — how fast coherence accumulates. The address does not. It records where the crossings went, not how long they took. Rate has to come back in through the maintenance side: R, f, and the retention time τ.

10. Falsification table

Claim	Fails if
Coding rule (§2)	Two blind readers disagree on more than one of six turns
Address 47 (§4)	Blind coding yields a different string
Mirror pairing (§5)	A blind-coded second tradition gives an unrelated integer
Depth bands (§6)	One documented practice stably holds 7 or 20 flat independent layers
Carry (§7)	A crowded period resolves into two new depths, or fails to settle

11. Status ledger

- **Derived.** The ternary bijection and the ceiling $(3^n-1)/2$, leading-zero invariance, the closed form v_p/(3^p−1), $R \circ R = 0$, the bound of n+1 rounds, the band series from m =

$\lfloor \log_3(2C+1) \rfloor - 1$, and — in Appendix A — f, C*, the plateau R, the identity C* = R·f, and the floor J_min.
- **Conditional.** Art works as routes rather than knots — holds if externalised storage is the distinguishing property, which the coding test in §8 examines.
- **Proposed.** The three-position coding rule. The address 47. The mirror pairing with a second tradition. σ and ϱ as measures of period crowding.
- **Not claimed.** That the address predicts quality, influence or reception. That the coding rule is unique. That any of this is settled before step 1 of §8 has been run.

Annotated References

Erickson, R. (trans.) (1995). ***Musica enchiriadis and Scolica enchiriadis*****. Yale University Press.** The earliest written account of a second voice against the chant. Why read it: it shows the transition of §1 in the language of the people who made it, before any theory existed to justify it. Theory arrives afterwards, which is what the model expects.

Hoppin, R.H. (1978). ***Medieval Music*****. Norton.** The standard survey for the period covering turns 2 and 3. Why read it: it gives the documentary basis for dating organum and isorhythm without committing to a cause story. Read the chapters on Notre-Dame and the isorhythmic motet.

Bent, M. (1992). "The Late-Medieval Motet." In T. Knighton & D. Fallows (eds.), ***Companion to Medieval and Renaissance Music*****. Dent, 114–119.** The most careful short treatment of *color* and *talea*. Why read it: it establishes that isorhythmic structure is not audible at any single moment, which is exactly the definition of an under-turn in §2.

Doe, P. & Allinson, D. "Tallis, Thomas." ***Grove Music Online*****. Oxford University Press.** The standard scholarly entry, including the scoring of *Spem in alium*. Why read it: the eight-times-five layout of §6 is a documented fact about the piece, not a reading of it, and the case only works if that stays a fact.

Bregman, A.S. (1990). ***Auditory Scene Analysis*****. MIT Press.** The foundational account of how simultaneous sound is parsed into streams. Why read it: it supplies the mechanism-free constraint behind §6 — what cannot be held apart cannot be maintained as a layer.

Huron, D. (2001). "Tone and Voice: A Derivation of the Rules of Voice-Leading from Perceptual Principles." ***Music Perception*** **19(1), 1–64.** Derives counterpoint rules from tracking limits rather than from tradition. Why read it: the concurrent-voice ceiling it reports is independent evidence for the band at 4, arrived at without any of this machinery.

Miller, G.A. (1956). "The Magical Number Seven, Plus or Minus Two." ***Psychological Review*** **63(2), 81–97.** The original capacity claim, and the one this model contradicts. Why read it: seven is not a band, so if Miller's number survives chunk-corrected re-analysis, the depth law for art is in trouble. Read it against Cowan.

Cowan, N. (2001). "The magical number 4 in short-term memory." ***Behavioral and Brain Sciences*** **24(1), 87–114.** The revision of Miller's seven down to about four. Why read it: the correction is the point — the band series predicts 4 and predicts nothing at 7.

Simon, H.A. (1962). "The Architecture of Complexity." ***Proceedings of the American Philosophical Society*** **106(6), 467–482.** Near-decomposability: complex systems that persist are nested. Why read it: it is the strongest existing motivation for reading Tallis as eight choirs of five rather than as forty layers.

Gombrich, E.H. (1960). ***Art and Illusion*****. Phaidon.** Schema and correction as the engine of pictorial change. Why read it: Gombrich's correction is the same event this model codes as a turn, and his figure–ground reversals are the mirror operation in visual form. Read the chapters on schema before the chapters on perception.

Krauss, R. (1979). "Sculpture in the Expanded Field." ***October*** **8, 30–44.** Reads a set of art categories as positions in a formal structure rather than as a chronology. Why read it: it is the closest existing precedent for treating art categories as addresses, and it shows how much can be said with very few positions.

Schank, R.C. & Abelson, R.P. (1977). ***Scripts, Plans, Goals, and Understanding*****. Erlbaum.** Script failure as the trigger for reorganisation. Why read it: it supplies the account of when a turn happens, which the address notation deliberately leaves out.

Knuth, D.E. (1997). ***The Art of Computer Programming*****, Vol. 2, §4.1.** Balanced ternary, including the carry. Why read it: everything arithmetical in §4 and §7 is standard there, and the section is four pages.

Konstapel, J. (2026). ***De Geometrie van Leren*** **and** ***From Prehistoric Chants to VALIS*****. constable.blog.** The rotation-language version of the same events. Why read it: §9 is only checkable against these two, and the musical case list in the second is the source of the six transitions in §4.

Konstapel, J. (2026). ***The Living Winding*** **and** ***The Depth of the Maze*****. constable.blog.** Where C ≤ R·f, the plateau R, and the band series come from. Why read it: §6 uses those results without re-deriving them, and the derivation is there.

Konstapel, J. (2026). ***Reengineering the Universe V3*** **and** ***How to Calculate Science*****. constable.blog.** The trit-addressed knowledge net and the carry as rewrite rule. Why read it: §7 and §8 are written directly on top of both.

Appendix A — Where R and f come from

Section 6 uses two numbers, R = 120 and f = 0.32. Neither is stipulated. Both follow from four rates and one flow, and this appendix does the algebra so that the article stands without any other document.

A.1 The five symbols

- **J** — throughflow. What passes through the closure per unit time: material, energy, attention, rehearsal.
- **μ** — commitments formed per unit throughflow.
- **λ** — the rate at which an unmaintained commitment lapses.
- **ν** — pattern-breaking events per unit throughflow. Loading damages what it builds.
- **r** — repair rate. How fast damage is cleared while repairing.

A knot alternates between two states: loading and repairing. It cannot do both at once.

A.2 The rest fraction

Let f be the share of time spent repairing. During the loading share, 1 − f, damage arrives at rate νJ. During the repair share, f, damage is cleared at rate r. In steady state the two balance:

$(1 - f)\cdot\nu J = f\cdot r$

Solve for f:

$$\mathbf{f = \nu J / (\nu J + r)}$$

f rises with throughflow and falls with repair speed. It cannot reach 1, and it is 0 only at $J = 0$.

A.3 The maintained count

Commitments form only while loading, at μ per unit throughflow, and lapse at λ:

$dC/dt = \mu J(1 - f) - \lambda C$

Set the derivative to zero and substitute $1 - f = r/(\nu J + r)$:

$$\mathbf{C^* = \mu J r / [\lambda(\nu J + r)]}$$

A.4 The plateau, and why C* = R·f

Let J grow without bound. The J in numerator and denominator cancels:

$C^*(J \to \infty) = \mu r / (\lambda\nu) \equiv \mathbf{R}$

R is a pure ratio of four rates: forming times repair, over lapse times damage. Now multiply R by f:

$R\cdot f = (\mu r/\lambda\nu) \cdot (\nu J/(\nu J + r)) = \mu r J / [\lambda(\nu J + r)] = C^*$

So the working bound of §6 is not an approximation. **C* = R·f is an identity.**

The derivative is $\mu r^2/[\lambda(\nu J + r)^2]$, which is positive everywhere. C* rises with throughflow, always, but towards a ceiling it never passes. This is the hard consequence for art: **you cannot reach the next band by working harder.** Going from 4 layers to 13 requires a different R — new rates, or nesting. Effort alone buys you the remaining distance to the plateau and nothing beyond it.

A.5 The numbers of §6

Take $\mu = 3$ commitments per unit throughflow, $r = 4$ repairs per day, $\lambda = 0.1$ per day, $\nu = 1$ event per unit throughflow.

$R = \mu r/(\lambda\nu) = (3 \times 4)/(0.1 \times 1) = 12/0.1 = \mathbf{120}$

For $f = 0.32$, solve $\nu J/(\nu J + r) = 0.32$ with $\nu = 1$ and $r = 4$:

$J = 0.32J + 1.28 \to 0.68J = 1.28 \to J = \mathbf{1.882}$

Then, by the identity, $C^* = 120 \times 0.32 = \mathbf{38.4}$. Check it against the direct formula:

$C^* = (3 \times 1.882 \times 4) / [0.1 \times (1.882 + 4)] = 22.588 / 0.5882 = \mathbf{38.4}$

The two routes agree. A knot with these rates and this throughflow holds 38 commitments. If it is carrying 47, it is nine over, exactly as §6 states.

A.6 The lower edge

There is also a floor. Let C_{min} be the smallest number of contacts at which the knot's defining cycles still close — below it, the pattern is no longer that pattern. Set $C^* = C_{min}$ and solve for J:

$\mu J r = \lambda C_{min} \cdot \nu J + \lambda C_{min} \cdot r$ $J(\mu r - \lambda \nu C_{min}) = \lambda C_{min} \cdot r$ $\mathbf{J_{min} = \lambda C_{min} \cdot r / (\mu r - \lambda \nu C_{min})}$

This requires $\mu r > \lambda \nu C_{min}$, which is the same as $R > C_{min}$. A knot whose plateau sits below its own minimum cannot exist at all.

With the numbers above and $C_{min} = 20$:

$J_{min} = (0.1 \times 20 \times 4) / (3 \times 4 - 0.1 \times 1 \times 20) = 8 / (12 - 2) = 8/10 = \mathbf{0.8}$

The knot needs a throughflow above 0.8 to keep its pattern closed. At $J = 1.882$ it is comfortably inside. The upper edge is not internal: it is whatever the surroundings actually supply.

For art this reads as a window, not a slope. A tradition running below J_{min} does not become worse. It loses a ring. The band structure predicts that such a loss is discrete and visible in the layer count, never fractional — a school that halves its throughput drops from 13 to 4, not to 9.