Volume IV

Tractatus Principio

—

On Difference

Volume IV

Book of Self-Referentiality

by

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Fractality

Fractals are regarded as the geometric wonderworld of mathematics: infinite patterns that repeat at every scale. Yet this description misses what is essential.

For fractality is not a phenomenon of numbers.

It is not a feature of forms.

It is the **self-relatedness of distinguishing itself**.

The difference between A and B is not static.

It is already the beginning of a new distinction:

How does A differ from B?

And this question generates the next level – and the one after next.

These layers do not operate one after another.

They **are** simultaneous.

Fractality is not in the things.

It is the movement that first lets the things appear as distinguishable.

For there is only this premise: the difference.

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Chapter I

Principia Fractalis

The Orders of Difference

1.1 Difference of the First Order

|

The difference of the first order designates pure distinction without poles.

It is not a relation between things, but the condition of relation.

Operational reading:

An operator without arguments.

1.2 Difference of the Second Order

A|B

The difference generates two positions.

A and B are not entities, but relational poles.

Fractal reference:

This is the first explication of the operator |.

1.3 Difference of the Third Order

```
A|B|C|D
```

The difference distinguishes its own distinctions.

Several poles arise in a common relational structure.

Operational reading:

```
|(|)
```

Fractal reference:

This is the minimal fractal unfolding:

Self-related iteration without stabilization.

1.4 Iterative Reading of the Orders

The orders of difference can be read as iterations:

```
|              → difference of the 1st order
A|B            → difference of the 2nd order
A|B|C|D        → difference of the 3rd order
A|B|C|D|E|F…   → continued self-distinction
```

It is not a matter of an increase of elements,

but of an increase of relational depth.

1.5 Minimal Transition to Fractal Mathematics

A fractal structure is present exactly when the following holds:

The difference distinguishes not only poles,

but its own order.

Read formally:

```
| → A|B → A|B|C|D → …
```

This is identical with:

```
| → |(|) → |(|(|)) → …
```

Fractality here is not a property of the set,

but a property of the order of distinction.

1.6 Memorandum (purely operational)

The orders of difference are not stages,

but iterations of the same operator.

Chapter II

Transitions between Orders of Difference (Δ)

2.1 The Transition as a Relation in Its Own Right

The transition between two orders of difference is not a leap,

but itself a relational operation.

It is designated by:

Δ

Δ is not a new object, but marks the transformation of one order into the next.

2.2 Minimal Transition

Example:

```
|   Δ   A|B
```

The difference of the first order unfolds into the second order.

Δ here designates not the difference itself, but its becoming-effective.

2.3 Transition of Higher Order

Example:

```
A|B   Δ   A|B|C|D
```

The difference distinguishes anew the poles that have already arisen.

The transition is self-related here.

Operational reading:

$$\Delta(|) = |(|)$$

2.4 Fractal Reading of Δ

A fractal dynamic is present when transitions themselves are again distinguished:

```
(|   Δ   A|B)   Δ   (A|B   Δ   A|B|C|D)
```

Δ operates here not linearly, but recursively.

Memorandum:

> Fractality arises when transitions do not disappear,

but become part of the structure.

2.5 Stable and Unstable Transition

Stable:

```
A|B   Δ   A|B
```

The transition preserves the order.

Unstable:

```
A|B   Δ   A|B|C|D
```

The transition generates new poles.

This is the minimal distinction between:

linear behavior

nonlinear unfolding

2.6 Preparation of the Fractal Operators

Δ functions as the base symbol for all later fractal operators:

recursive difference

oscillation

rotation

coupling

These operators are specializations of Δ,

not additional concepts.

2.7 Memorandum

> An order is a relation.

A transition is likewise a relation.

Fractality begins where relations act upon relations.

Chapter III

Stabilization and Recurrence of Orders of Difference

3.1 Stability as Relational Property

An order of difference is stable when distinguishing it further

generates no new order.

Stability is not rest, but invariant self-relation.

3.2 Minimal Example of Stability

Example:

```
A|B|C   Δ   A|B|C
```

The order is preserved when it is distinguished further.

Operational reading:

The difference operates, but does not change the structure.

3.3 Recurrence (Fixed Point)

An order that, under Δ, leads back to itself forms a fixed point:

```
O   Δ   O
```

where O designates an order of difference.

Minimal example:

```
A|B|C   Δ   A|B|C
```

This is the simplest form of fractal self-similarity.

3.4 Unstable Recurrence

Not every repetition is stable.

Example:

```
A|B   Δ   A|B|C|D   Δ   A|B
```

The order returns, but not invariantly.

This is a cyclical self-distinction.

Operational reading:

The structure oscillates between orders.

3.5 Cycle Formation

A cycle is present when several orders of difference

are connected with one another by Δ:

```
O₁   Δ   O₂   Δ   O₁
```

Example:

```
A|B   Δ   A|B|C|D   Δ   A|B
```

Cycles are not errors,

but regular forms of nonlinear dynamics.

3.6 Preparation of Oscillation

The repeated, unstable recurrence of an order

forms the basis for fractal oscillation.

Oscillation here is:

not periodic movement in space

but a periodic change of the order of difference

3.7 Memorandum

Stability does not mean standstill.

It means that the difference distinguishes itself,

without changing its order.

Chapter IV

Oscillation as Alternation of the Order of Difference

4.1 Concept of Oscillation (operational)

Oscillation designates no temporal course,

but a regular alternation between orders of difference.

It is present when no order is permanently stabilized,

but the relation between orders swings back and forth.

4.2 Minimal Oscillation Schema

$$O_1 \quad \Delta \quad O_2 \quad \Delta \quad O_1 \quad \Delta \quad O_2 \quad \dots$$

where O_1 and O_2 are different orders of difference.

Example:

```
A|B   Δ   A|B|C|D   Δ   A|B   Δ   …
```

The structure returns,

but not to the same relational depth.

4.3 Oscillation without External Parameters

Oscillation requires:

no time parameter

no frequency

no movement in space

It arises exclusively from the self-distinction of the transitions.

Operational reading:

The transition Δ itself becomes unstable.

4.4 Order-Preserving vs. Order-Changing Oscillation

$$Order-preserving:$$

```
O   Δ   O   Δ   O
```

This is not oscillation, but stability.

$$Order-changing:$$

```
O₁   Δ   O₂   Δ   O₁
```

This is the minimal fractal oscillation.

4.5 Nested Oscillation

Oscillation can itself be distinguished:

```
(O₁   Δ   O₂)   Δ   (O₃   Δ   O₄)
```

Here not only orders alternate,

but patterns of alternation.

This is the entry into higher fractal dynamics.

4.6 Preparation of the Fractal Operators

Oscillation forms the basis for:

fractal difference

rotation

multidimensional coupling

All these operators describe structured oscillations of orders of difference.

4.7 Key Sentence

Oscillation is not a course in time,

but a periodic change of the relational order.

Chapter V

Coupling of Oscillations – Relational Networks

5.1 Coupling as Simultaneous Relation

A coupling is present when several oscillations are not independent,

but act on one another.

It is not a connection of objects,

but a relation of transitions.

5.2 Minimal Coupling of Two Oscillations

Schema:

```
(O₁  Δ  O₂)  ||  (P₁  Δ  P₂)
```

The two alternations do not take place one after the other,

but relationally at the same time.

Example:

```
(A|B  Δ  A|B|C|D)  ||  (E|F  Δ  E|F|G|H)
```

The orders influence one another,

without merging.

5.3 Cross-Coupling

In a cross-coupling, the transition of one oscillation acts back

on the order of the other:

```
(O₁   Δ   O₂)   Δ   (P₁   Δ   P₂)
```

Operational reading:

A transition is itself distinguished by another transition.

5.4 Network Formation

A relational network arises when several coupled oscillations

can no longer be unfolded linearly:

$$(O_1 \Delta O_2) \Delta (P_1 \Delta P_2) \Delta (Q_1 \Delta Q_2) \ldots$$

The structure is no longer readable as a chain,

but only as simultaneous dynamics of difference.

5.5 Order in the Network

A network has no central order.

Stability arises locally through compatible transitions.

Minimal example:

$O_1 \Delta O_2$

```
|     |
Δ     Δ
|     |
```

$P_1 \Delta P_2$

The orders stabilize themselves relationally,

not hierarchically.

5.6 Preparation of Nonlinear Mathematics

With network formation, the transition is completed from:

linear unfolding

cyclical dynamics

to:

nonlinear, fractal structure

From here on, no global order can still be presupposed.

Mathematics becomes self-referentially distributed.

5.7 Key Sentence

A network is not a mesh of things,

but a coupling of transitions.

Chapter VI

Measure, Depth, and Fractal Dimension of Orders of Difference

6.1 Measure as Relational Property

A measure describes no magnitude,

but the depth of the self-distinction of an order.

Measure is therefore not an external scale,

but arises in the difference itself.

6.2 Depth of the Order of Difference

The depth of an order corresponds to the number of effective self-relations.

Examples:

```
|                → depth 0
A|B              → depth 1
A|B|C|D          → depth 2
A|B|C|D|E|F|G|H  → depth 3
```

The depth does not grow through new elements,

but through recursive ordering of the order.

6.3 Measure through Transitions

The measure of an order shows itself in the effect of Δ:

slight change → slight depth

strong change of order → greater depth

Minimal example:

```
A|B   Δ   A|B        → slight depth
A|B   Δ   A|B|C|D    → greater depth
```

6.4 Fractal Dimension (operational)

The fractal dimension of a structure results from the ratio:

order of distinction

to

order of transition

Formally noted (purely relational):

D := ratio(order, Δ)

This is not a numerical definition,

but a comparative relation between depths.

6.5 Minimal Comparison

Example:

O_1 = A | B

O_2 = A | B | C | D

If:

```
O₁   Δ   O₂
```

then O_2 possesses a higher fractal dimension than O_1,

since the transition itself has a structure-forming effect.

6.6 Dimension without Number

The fractal dimension here is:

no real value

no measured quantity

no constant

It is an order-relation between structures.

Key sentence:

Dimension is the answer to how deeply the difference distinguishes itself.

6.7 Conclusion of the Linear Part

With measure, depth, and dimension, the linear introduction is concluded.

From here on:

transitions act on transitions

oscillations couple themselves in a network-like way

measures are no longer globally comparable

Mathematics becomes nonlinear.

6.8 Transitional Sentence

What follows is not a continuation,

but a self-unfolding of the system.

Chapter VII

Fractal Difference (⊖)

7.1 Positing

Fractal difference designates a transition

in which not only the order of difference,

but the transition itself is effectively distinguished.

In Principio notation:

$$⊖ := Δ(Δ)$$

Fractal difference is therefore a recursive transition.

7.2 Minimal Example

```
A|B   ⊙   A|B|C|D
```

Reading:

The order changes through a change in the transition structure.

Comparison:

```
A|B   Δ   A|B|C|D    → transition
A|B   ⊙   A|B|C|D    → transition of the transition
```

7.3 Iteration of Fractal Difference

Fractal difference is iterable:

$$\ominus^1 = \Delta \; \ominus^2 = \Delta(\Delta) \; \ominus^3 = \Delta(\Delta(\Delta))$$

With growing iteration, the depth of self-relatedness increases.

7.4 Key Sentence

Fractal difference describes not how much changes,

but how transitions change their own structure.

Chapter VIII

Fractal Linkage (⊛)

8.1 Positing

Fractal linkage designates the simultaneous effectiveness of several transitions.

In Principio notation:

$$\circledast := \Delta \parallel \Delta$$

⊛ is neither addition nor connection,

but a relational coupling.

8.2 Minimal Example

```
(A|B   Δ   A|B|C|D)   ⊛   (E|F   Δ   E|F|G|H)
```

The orders of difference do not unfold independently,

but act on one another as they unfold.

8.3 Nested Linkage

```
⊛¹₁  → simple coupling
⊛²₁  → nested coupling
⊛ⁿₘ  → fractal network
```

The indices designate depth and breadth of the coupling,

not dimensions or coordinates.

8.4 Key Sentence

Linkage connects nothing.

It causes transitions to structure one another.

Chapter IX

Fractal Oscillation (⨀̃)

9.1 Positing

Fractal oscillation is present

when a transition generates no stable order,

but leads into an unstable return.

In Principio notation:

$$⨀̃ := Δ \; ↺ \; Δ$$

9.2 Minimal Example

```
A|B   ⊙̃  A|B|C|D   ⊙̃  A|B   …
```

The order returns,

but not invariantly.

9.3 Oscillation of Higher Order

$$(A|B \; ⨀̃ \; A|B|C|D) \; ⨀̃ \; (E|F \; ⨀̃ \; E|F|G|H)$$

Here oscillations themselves oscillate.

This is the entry into multilayered fractal dynamics.

9.4 Key Sentence

Oscillation is the form

in which the difference cannot be stabilized.

Chapter X

Fractal Rotation ($\mathcal{R}$)

10.1 Positing

Fractal rotation describes a directed transition.

It is not the order that changes, but its orientation.

In Principio notation:

$\mathcal{R}$:= directed Δ

10.2 Minimal Example

```
A|B   ℛ   B|A
```

The poles are preserved,

their relational reading direction changes.

10.3 Iteration

$\mathcal{R}^2$ → return of orientation

$\mathcal{R}^3$ → new cyclical order

Rotation is therefore a cyclical transition structure,

not movement in space.

10.4 Key Sentence

Rotation changes not the order,

but the direction of the distinction.

Chapter XI

Summary of the Fractal Operators

All introduced operators are specializations of the difference:

Operator

Relational Meaning

⊖

transition of the transition

$\circledast$

coupling of transitions

$\widetilde{\ominus}$

unstable return

$\mathcal{R}$

directed transition

Network

nested Δ-structure

Closing Key Sentence

The fractal operators do not extend the system.

They unfold what is already laid out in the difference.

Chapter XII

Indeterminacy δ as Instability of the Order of Transition

12.1 Positing

Indeterminacy designates no inaccuracy of description,

but a non-fixability of transition.

δ is not a disturbance factor,

but a relational quality of its own.

12.2 Operative Definition

In Principio notation:

δ := Δ without stabilization

That means:

A transition acts,

without committing itself to an unambiguous order of difference.

12.3 Minimal Example

```
A|B   Δ   ?
```

The transition generates no fixed order,

but a range of possible orders.

Written operatively:

```
A|B   Δδ   A|B|C|D …
```

12.4 Indeterminacy of Higher Order

Indeterminacy can itself be distinguished:

```
(A|B   Δδ   A|B|C|D)   Δδ   …
```

Here not only the order is indeterminate,

but the structure of the transition itself.

This is fractal indeterminacy.

12.5 Relation of δ to the Fractal Operators

⊖ without δ → structured recursion

⊖ with δ → unstable recursion

$\widetilde{\ominus}$ with δ → chaotic oscillation

Indeterminacy is therefore no exception,

but a mode of unfolding.

12.6 Memorandum

Indeterminacy does not mean absent order,

but absent fixation of the order.

Chapter XIII

Observer as Relational Position

13.1 Positing

An observer is not an external subject,

but a position within the order of difference.

It is noted as a relation of its own.

13.2 Observer Notation

◎

◎ designates a marked position of distinction.

13.3 Observer Difference

The difference between observer and order is written as:

$$◎ \mid A|B$$

Reading:

The order A|B is distinguished from the standpoint of a particular relational position.

13.4 Effect of the Observer

The observer generates no new order,

but fixes transitions.

Example:

```
A|B   Δδ   A|B|C|D
◎ | (A|B   Δ   A|B|C|D)
```

What previously was indeterminate

is determined by the observer relation.

13.5 Several Observers

Several observers generate no objectivity,

but coupled perspectives:

$$◎_1 \mid (A|B)\ ◎_2 \mid (A|B)$$

Objectivity here is no agreement,

but compatibility of the relations.

13.6 Memorandum

An observer is not a standpoint outside the structure,

but a fixation within the relation.

Chapter XIV

Conclusion: Transition to the Nonlinear System

With the operators ⊖, ⊛, $\widetilde{⊖}$, $\mathcal{R}$ and the introduction of δ and ◎

the system is fully operable.

From here on:

Transitions act on transitions

Indeterminacy is structural

Observation is relational

Networks cannot be unfolded linearly

Chapter XV

Overview of the Principio Fractal Operators

(with minimal examples of application)

1. Basic Notation of the Orders of Difference

```
|               Difference of 1st order
A|B             Difference of 2nd order
A|B|C|D         Difference of 3rd order
A|B|C|D|…       higher self-distinction
```

Application (minimal):

Structuring

Classification

Basic relation without sets

2. Transition (Δ)

Meaning:

Transformation of one order of difference into another.

$$O_1 \quad \Delta \quad O_2$$

Application:

Modeling of change

Structural development

Transition between states

Example:

```
A|B   Δ   A|B|C|D
```

3. Fractal Difference (⊖)

Meaning:

Recursive transformation of the transition itself.

$$⊖ := Δ(Δ)$$

Application:

multi-stage development

nonlinear change

structural growth

Example:

```
A|B   ⊙   A|B|C|D
```

(the transition generates new transition structure)

4. Fractal Linkage (⊛)

Meaning:

Simultaneous coupling of several transitions.

$$⊛ := Δ \parallel Δ$$

Application:

Networks

Parallel processes

coupled dynamics

Example:

$$(A|B\ Δ\ A|B|C|D) ⊛ (E|F\ Δ\ E|F|G|H)$$

5. Fractal Oscillation ($\widetilde{⊖}$)

Meaning:

Unstable recurrence between orders of difference.

$$\widetilde{\ominus} := \Delta \cup \Delta$$

Application:

cyclical processes

alternating states

resonances

Example:

$$A|B \widetilde{\ominus} A|B|C|D \widetilde{\ominus} A|B \ldots$$

6. Fractal Rotation ($\mathcal{R}$)

Meaning:

Directed transition with change of orientation.

$\mathcal{R}$:= directed Δ

Application:

change of perspective

phase shift

inversion of relations

Example:

```
A|B   ℛ   B|A
```

7. Indeterminacy δ

Meaning:

Non-fixability of an order of transition.

$\Delta\delta$

Application:

open systems

unstable transitions

ambiguity without chance

Example:

```
A|B   Δδ   A|B|C|D …
```

8. Observer (◎)

Meaning:

Fixed relational position within the structure.

◎ | O

Application:

perspectives

measurement

stabilization of transitions

Example:

◎ | (A|B Δ A|B|C|D)

9. Networks

Meaning:

Nested transition structures that cannot be unfolded linearly.

$$(O_1 \ \Delta \ O_2) \ \Delta \ (P_1 \ \Delta \ P_2) \ \Delta \ \ldots$$

Application:

complex systems

distributed dynamics

self-referential structures

Example:

$$(A|B \ \Delta \ A|B|C|D) \ \Delta \ (E|F \ \Delta \ E|F|G|H)$$

10. Summary Memoranda

Differences generate orders.

Transitions generate dynamics.

Fractal operators describe self-relatedness.

Nothing is measured.

Everything is put into relation.

11. Minimal Path of Application

Linear:

$$| \to A|B \to A|B|C|D$$

Nonlinear:

$$A|B \ominus (A|B|C|D) \circledast (E|F|G|H)$$

Fractal:

$$(A|B \mathbin{\widetilde{\ominus}} A|B|C|D) \circledast (E|F \mathbin{\mathcal{R}} F|E)$$

Example Process 1: Stabilization from a Simple Transition

Goal: show how a fixed point arises from Δ.

Start:

A|B

Step sequence:

```
A|B    Δ    A|B|C|D
A|B|C|D    Δ    A|B|C|D
```

Reading:

First expansion of the order, then stabilization (fixed point).

Result form:

```
O    Δ    O
```

Example Process 2: Oscillation between Two Orders

Goal: show how $\widetilde{\ominus}$ functions as an alternation of orders.

Start:

A|B

Step sequence:

```
A|B    ⊙̃    A|B|C|D    ⊙̃    A|B    ⊙̃    A|B|C|D    ⊙̃    …
```

Reading:

No order stabilizes itself; the structure oscillates.

Result form:

```
O₁   Δ   O₂   Δ   O₁   Δ   O₂   …
```

Example Process 3: Fractal Difference (⊖) as “Transition of the Transition”

Goal: show that ⊖ is not “more Δ,” but Δ on Δ.

Start:

A|B

Step sequence (recursive):

```
A|B   Δ   A|B|C|D
(A|B   Δ   A|B|C|D)   Δ   (A|B|C|D   Δ   A|B|C|D|E|F|G|H)
```

Short notation:

```
A|B   ⊙   A|B|C|D|E|F|G|H
```

Chapter XVI

Reading:

Not only does the order grow, but the structure of growth is distinguished anew.

Example Process 4: Network Formation through Coupling (⊛)

Goal: show how two processes structure each other reciprocally.

Start (two subprocesses):

P: A|B

Q: E|F

Individual steps:

```
A|B   Δ   A|B|C|D
E|F   Δ   E|F|G|H
```

Coupling:

```
(A|B Δ A|B|C|D)   ⊛   (E|F Δ E|F|G|H)
```

Continuation as network:

```
((A|B Δ A|B|C|D) ⊛ (E|F Δ E|F|G|H))   Δ   R|S|T|U|…
```

Reading:

The coupling generates a new order that is not reducible to either of the two strands.

Example Process 5: Indeterminacy δ and Observer (◎) as Fixation

Goal: show that δ is structural and ◎ fixes transitions.

Start (indeterminate transition):

```
A|B   Δδ   A|B|C|D …
```

The observer establishes a fixation:

```
◎ | (A|B   Δ   A|B|C|D)
```

Consequence:

```
A|B   Δδ   …
◎ | (…)  ⇒  A|B   Δ   A|B|C|D
```

Reading:

δ means: transition not fixed.

◎ means: transition is drawn as a determinate relation.

Cookbook of Principio Fractal Mathematics

(Operative Patterns)

Recipe A – Stabilizing

Goal:

Fix an order of difference.

Ingredients:

Order O

Transition Δ

Procedure:

```
O   Δ   O
```

Example:

```
A|B|C   Δ   A|B|C
```

Result form:

Fixed point, stable structure

When to use:

Classification

Invariance

Conclusion of a development

Recipe B – Oscillating

Goal:

Force alternation between two orders.

Ingredients:

Two orders O_1, O_2

Oscillation $\widetilde{\ominus}$

Procedure:

```
O₁  ⊝̃  O₂  ⊝̃  O₁  ⊝̃  …
```

Example:

```
A|B  ⊝̃  A|B|C|D  ⊝̃  A|B  …
```

Result form:

Periodic alternation of order

When to use:

Resonances

boundary states

rhythmic dynamics

Recipe C – Growing (fractal difference)

Goal:

Not only expand structure, but deepen transitions.

Ingredients:

Initial order O

Fractal difference ⊖

Procedure:

```
O   ⊙   O'
```

Example:

```
A|B   ⊙   A|B|C|D|E|F|G|H
```

Result form:

Self-similar expansion

When to use:

Development

Scaling

nonlinear growth

Recipe D – Networking (coupling)

Goal:

Make several processes effective simultaneously.

Ingredients:

Two transitions

Linking ⊛

Procedure:

```
(O₁ Δ O₂)   ⊛   (P₁ Δ P₂)
```

Example:

$$(A|B\ \Delta\ A|B|C|D) \circledast (E|F\ \Delta\ E|F|G|H)$$

Result form:

Nonlinear network

When to use:

Parallel processes

complex systems

coupled dynamics

Recipe E – Allowing Indeterminacy

Goal:

Keep transition open.

Ingredients:

Order O

Transition with indeterminacy Δδ

Procedure:

```
O   Δδ   O' …
```

Example:

```
A|B   Δδ   A|B|C|D …
```

Result form:

Range of possible orders

When to use:

open systems

exploration

unstable processes

Recipe F – Fixing (inserting observer)

Goal:

Determine an indeterminate transition.

Ingredients:

Observer ◎

Transition

Procedure:

$$◎ \mid (O_1 \, \Delta \, O_2)$$

Example:

◎ | (A|B Δ A|B|C|D)

Result form:

Determinate transition

When to use:

Measurement

decision

perspective fixation

Recipe G – Orienting (rotation)

Goal:

Reverse or reread relation.

Ingredients:

Order O

Rotation $\mathcal{R}$

Procedure:

```
O   ℛ   O⁻¹
```

Example:

```
A|B   ℛ   B|A
```

Result form:

Oriented relation

When to use:

change of perspective

inversion

phase shift

Short Rule (for Practice)

Δ changes orders.

⊖ changes transitions.

⊛ couples dynamics.

$\widetilde{\ominus}$ keeps systems in motion.

δ opens.

⊚ fixes.

Example Run 1: Stabilizing, Growing, Oscillating (with Numbers)

Start: number 2 as order

$$O(2) = 0|1|2$$

Step A: Transition (Δ) – “one order further”

```
0|1|2   Δ   0|1|2|3   = O(3)
```

Step B: Stabilization (fixed point)

We assume that it remains stable under further Δ (fixed-point pattern):

```
0|1|2|3   Δ   0|1|2|3
```

Step C: Fractal Growing (⊖) – “transition of the transition”

Instead of merely increasing the order by +1, we make a recursive leap:

```
0|1|2   ⊙   0|1|2|3|4   = O(4)
```

(Interpretation: not “+2,” but Δ is structurally deepened; the result appears as a greater unfolding.)

Step D: Oscillation ($\widetilde{\ominus}$) between 3 and 4

O(3) $\widetilde{\ominus}$ O(4) $\widetilde{\ominus}$ O(3) $\widetilde{\ominus}$ O(4) …

$$0|1|2|3 \,\widetilde{\ominus}\, 0|1|2|3|4 \,\widetilde{\ominus}\, 0|1|2|3 \ldots$$

Example Run 2: Coupling (⊛) of Two Number Processes

We let two “number orders” run simultaneously:

$$P : O(3) = 0|1|2|3 Q : O(2) = 0|1|2$$

Both make a transition:

```
P: 0|1|2|3   Δ   0|1|2|3|4
Q: 0|1|2     Δ   0|1|2|3
```

Now we couple the transitions:

```
(0|1|2|3 Δ 0|1|2|3|4)  ⊛  (0|1|2 Δ 0|1|2|3)
```

Concrete effect (minimally visible):

The new order takes up both lines of development as simultaneously effective, e.g. as a nested order:

```
0|1|2|3|4  ⊛  0|1|2|3   ⇒   0|1|2|3|(4|3)
```

("4|3" stands here as a coupling node: two ends that do not merge into one final value, but persist as relational tension.)

Example Run 3: Indeterminacy δ and Observer (◎) — "the number is not fixed"

Indeterminate transition from O(3)

```
0|1|2|3   Δδ   0|1|2|3|4  …
```

Here δ means: The transition is not fixed (e.g. it could also unfold otherwise).

We show this as two possible subsequent branches:

```
0|1|2|3   Δδ   { 0|1|2|3|4   or   0|1|2|3|5 }
```

Observer fixes (◎)

$$◎ \mid (0|1|2|3\,\Delta\,0|1|2|3|4)$$

Thus the indeterminacy becomes a determinate path:

```
0|1|2|3  →  0|1|2|3|4
```