Line Theory: Effect, Node, and Line in Space

Temesgen Degu

degu-temesgen@proton.me

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Abstract

This paper introduces a conceptual framework, denoted as 'Line Theory,' which is predicated on the procedural anatomy inherent in ordinary plans. A plan, recognized as a set of instructions for execution, undergoes in-depth scrutiny to analyze its constituent elements. The concise examination delves into the formation of line and effect within real space stemming from procedures. Line theory serves the purpose of elucidating the absolute optimization of plans. It is formulated to inaugurate an exploration into the veracity of procedures and their elemental changes, examining their correlation with space and motion at the most fundamental level. The scientific community has extensively delved into the examination of the behavior and structure of objects at the microscopic level. This paper endeavors to stimulate interest in the analogous analysis of procedures. The fundamental objective within this theoretical framework is to offer a distinct philosophical perspective on changes and effects.

1. Introduction

A plan or procedure is delineated as a set of sequential steps designed to accomplish a specific objective (Edward 2021). It is characterized as a series of instructions executable in practice (Robert 2011). The anticipated outcome is the manifestation of the desired effect when all steps in a properly formulated plan are executed. The initial state preceding the plan's execution is termed the ‘seed’, while the result of the execution is termed the ‘effect’. This paper introduces Line Theory, grounded in procedural concepts. Line Theory posits that when any plan, procedure, or set of instructions are zoomed in on to the extreme, they are the motion of objects from one position to another, encapsulating the seed-to-effect continuum. To illustrate, consider a conventional procedure for making tea. The following is a demonstration of how a simple literal procedure for making a cup of tea can be transformed into a line.

<u>Ingredients and utensils:</u>

1. Water

2. Teabag

3. Teacup or Mug

4. Kettle

5. Spoon

6. Sugar

Procedure: standard/high-level

1. Boil the water

2. Pour the hot water into the teacup

3. Add the teabag into the cup

4. Steep the teabag

5. Add the required amount of sugar and stir

Procedure: zoomed-in/lower-level

1. Lift the cup of water up to the kettle

2. Incline the cup forward to pour the water into the kettle

3. Move the kettle's plug toward a socket

4. Position the plug into the socket

5. Press down the ON button on the kettle, and let the water heat up

6. Bring the kettle in proximity to the teacup

7. Incline the kettle forward to pour the hot water into the cup

8. Move the teabag toward the cup

9. Insert the teabag into the cup

10. Move the teabag up and down until the water transforms into tea

11. Lift the teabag out of the cup

12. Move the spoon toward the sugar bowl

13. Incline and insert the spoon into the bowl to pick up sugar

14. Move the spoon up to the cup

15. Tilt the spoon to dispense the sugar into the cup

16. Add the spoon into the cup

17. Move the spoon around until the sugar dissolves

<u>Procedure: zoomed-in to the lowest level</u>

Figure 1: Depiction of a procedure as a line of changes

Temesgen Degu, degu-temesgen@proton.me)

As illustrated in the aforementioned instance and its figure, when zooming in on the 'procedure to prepare a cup of tea,' it becomes evident that it constitutes a sequence of spatial motions executed by the objects or elements involved. Each dot in the figure corresponds to the minutest alteration in motion. Upon maximum magnification, any procedure manifests as a continuum of alterations in space, as briefly demonstrated above. Consequently, a procedure can be redefined as a succession of changes, representing motions from one spatial point to another. Such line formations are observable in various procedures, provided one can meticulously detail them to their most granular level.

While an atom is acknowledged as the most diminutive unit of an element (Wolfgang 2018), this paper designates the tiniest change in a line as a ‘node’. A node constitutes the most minuscule conceivable shift in space. Consequently, a procedure, when meticulously examined, reveals itself as a progression of nodes that coalesce into a line. Each dot in the aforementioned figure symbolizes a node. The specific length of a node remains undefined within the purview of this paper. Nevertheless, in line theory, the contention arises regarding the existence of this most minute unit of change. Consequently, this assertion posits that a finite number of alterations exist within any procedure characterized by a defined seed and effect.

The execution of a specific line or procedure predominantly involves three entities: line, element(s), and executor(s). Elements denote objects constituting the effect of a procedure. An executor represents an entity that initiates and maintains the execution of a line.

Specifically, an executor endows elements with energy, facilitating their movement. In the exemplar mentioned earlier, the individual preparing the tea serves as an executor, while the utensils and ingredients function as elements. In line theory, the term effect is defined as the configuration or alignment of elements in a specific form resulting from the execution of a line. A procedure may involve multiple executors and elements. However, in theory, the procedure could be transformed into a single line with a specified seed and effect. The executors or elements collectively execute a segment of the line.

A set of nodes within the line at the right end of the figure below is color-coded to illustrate that these alterations are carried out by a specific element in the procedure. This segment of the line is designated as a 'supernode'. A supernode, essentially a sequence of nodes, represents a subdivision of a line. Each color-coded set of nodes in the illustration could be considered an occurrence of a supernode. As illustrated below, a supernode can be linked to a specific element in a procedure; it may possess its own seed and effect, particularly when executed by a specific element in a procedure.

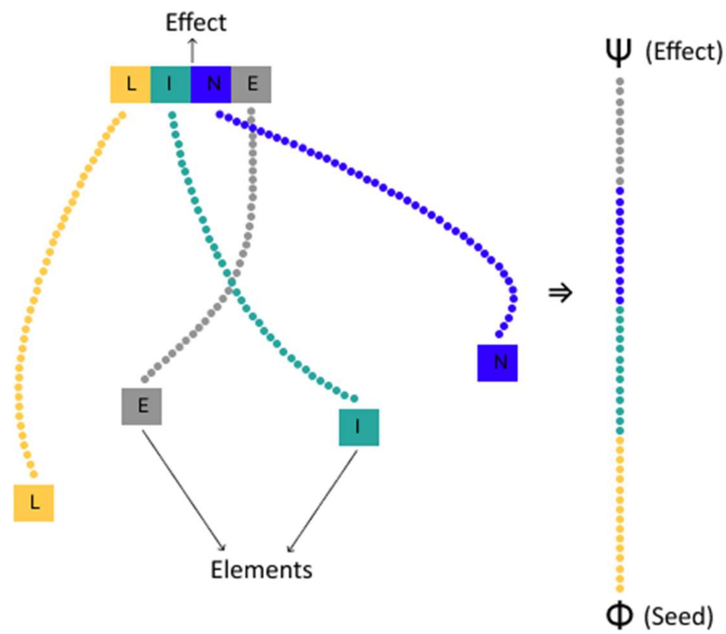

Figure 2. A procedure with multiple elements

2. Matterial line

Assuming the development of a procedure to achieve a specific effect, one might question its optimality and subsequently seek a superior plan producing the same effect. In this context, line theory delineates the ‘matterial line’, defined as the line that yields effect in the absolute shortest time for a specified state of an executor or executors. To optimize a procedure, high-level analytical reasoning may be employed. However, in line theory, the initial step involves converting a procedure into a line in real space and identifying all the elements contributing to the effect. Subsequently, the matterial line is constructed by compiling the straight line between the seed and effect of every element involved. The figure below illustrates the matterial line for an element within the effect. The line labeled as the 'immatterial line' represents the original line in real space for element I. As depicted in the figure, the matterial line for element I is the straight line extending from seed to effect. In the context of a matterial line, it is essential to identify the seed and effect for all elements constituting the end effect. The seed denotes the actual position of elements in space before the execution of a line, while the effect is the location of the elements at the conclusion of the line's execution. To derive the matterial line for a procedure, one must consider the straight line between the seed and effect of each element in the procedure. These resulting lines can then be amalgamated to form a singular matterial line for the end effect or procedure.

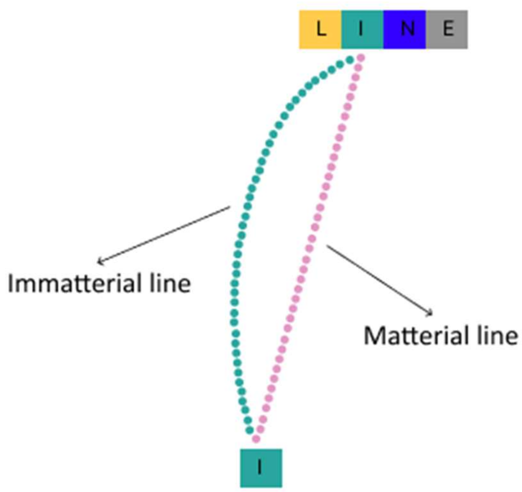

Figure 3. Matterial and immatterial line

In practice, detailing a procedure into a line for each involved element may prove immensely demanding. Nevertheless, for the pursuit of the absolute optimized procedure or matterial line, the conversion of the procedure into a line is imperative. Subsequently, the matterial line comprises the concatenation of the straight line between the initial position (seed) and the final position (effect) for each element in the procedure. The resulting composite line would then represent the matterial line for a given procedure. This matterial line could subsequently be transformed into a high-level literal procedure.

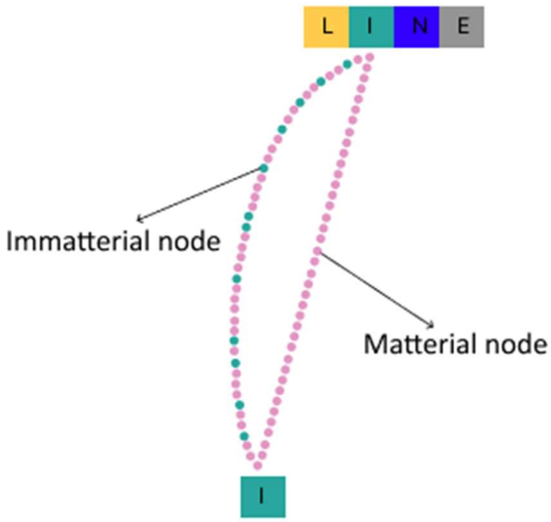

Figure 4. Matterial and immatterial node

The fundamental aspect within a matterial line is a matterial node. All nodes within a matterial line between a seed and an effect are designated as matterial nodes. Line theory posits that only matterial nodes in a line contribute to an effect. Conversely, 'immatterial' nodes are changes incorporated into a line that do not contribute to an effect. A line containing immatterial node(s) is referred to as an immatterial line.

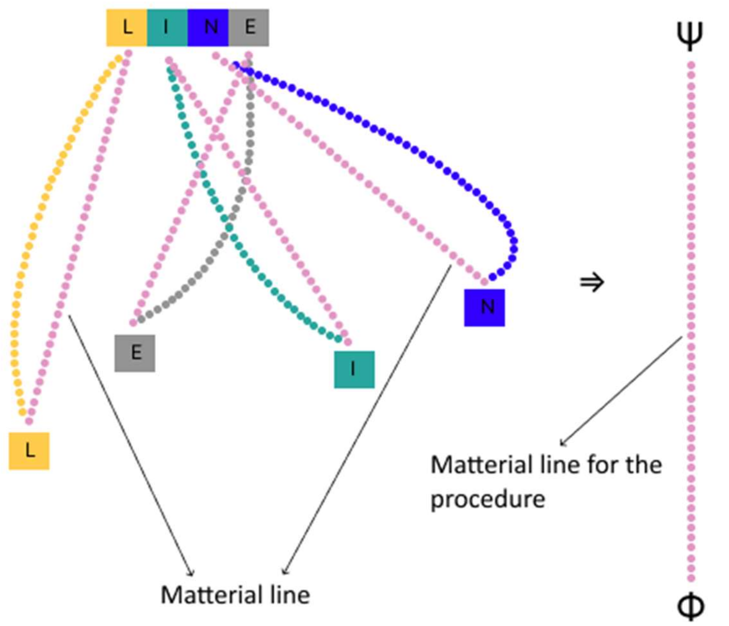

Figure 5. Matterial line for elements

A line typically comprises both matterial and immatterial nodes. All immatterial nodes within a line lack significance for the effect of the line. In other words, the same effect will be achieved even if one, more, or all of the immatterial nodes are omitted or excluded from the line. Conversely, the effect will not manifest if any of the matterial nodes are not executed. An unlimited number of immatterial nodes can be added to a line without altering the seed and effect. This modification will affect the time required to achieve the effect, but not the effect itself. As long as the matterial nodes are present in the line, the effect is guaranteed.

As previously mentioned, upon obtaining a matterial line for a procedure, the line consistently ensures the shortest execution time relative to any fixed state of an executor. Consider the scenario where there are two executors, each possessing distinct energy levels, assigned to execute matterial and immatterial versions of a line. The executor aligned with the matterial line is anticipated to record a lower execution time, given the line's fewer nodes. Nonetheless, the executor endowed with higher energy might achieve a lower execution time for the immatterial line. Consequently, when comparing execution times, it is imperative for an executor to uphold uniform conditions for all versions of a line.

3. Casting

For a designated seed and effect, multiple procedures can be formulated to yield identical effects. Provided that any procedure is verified to deliver a required effect from a particular seed, the matterial line or nodes for the effect are encompassed in all of the conceivable procedures. The effect is exclusively attributed to the matterial line within any of the procedures. Any supplementary extensions departing from the matterial line are deemed immatterial and do not contribute to the effect of the procedures.

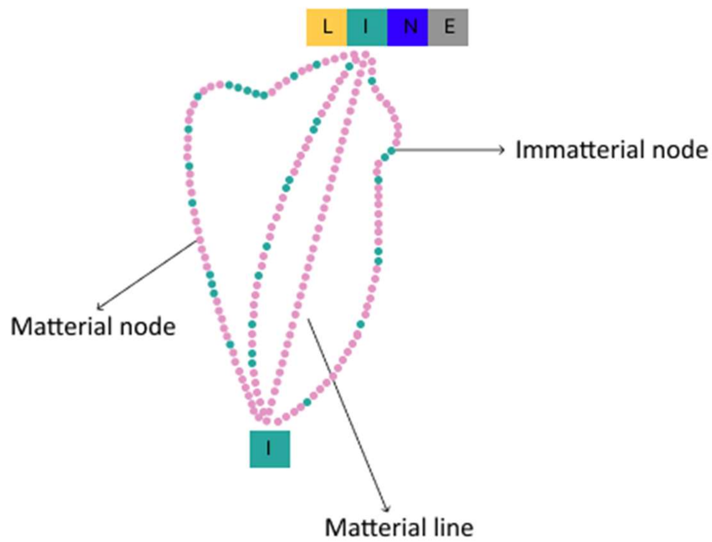

Figure 6. Matterial nodes within distinct lines of the same seed and effect

Casting is the process of extracting a matterial line from any procedures defined for a particular effect. The fundamental principle in casting is that all procedures sharing the same seed and effect encompass identical matterial nodes. The same matterial line can be derived through casting from any of these procedures. Essentially, all procedures related to a specific seed-effect can be cast or distilled down to the same line, a matterial line. The distinction among the procedures lies in the quantity of immatterial nodes they incorporate. This supports the assertion that there exists only one matterial line between a specified seed and effect. However, an unbounded number of lines can be generated by introducing immatterial nodes. Despite each line following a distinct path, the identical matterial nodes present in Line A also exist in Line B, for instance.

The elementary method for casting involves ‘node-drop’. Node-drop entails the removal of a node from a line, followed by the subsequent analysis of the line's effect. If a node is omitted from a line, and the resultant line produces the same effect, the node is deemed immatterial. Employing this methodology for each node in every line formulated for a fixed seed-effect ensures an identical outcome—a designated matterial line. However, the adoption of this approach in casting a procedure seems to be time-consuming, given that it necessitates an in-depth specification of a procedure toward a node.

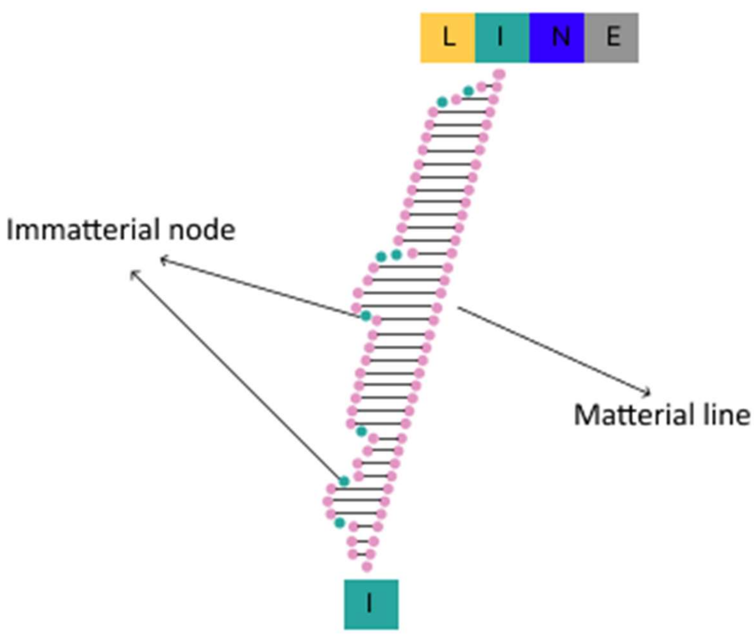

Figure 7. Node mapping

Illustrated in the aforementioned figure, one can perform matterial node mapping to discern the immatterial nodes within a given line. Upon acquiring a matterial line for a specified seed and effect, it theoretically becomes feasible to pinpoint the matterial and immatterial nodes in other lines sharing the same seed and effect. To achieve this, as briefly outlined in the figure above, a hypothetical perpendicular line must be drawn from each matterial node in a matterial line towards an immatterial line of identical seed-effect. Subsequently, one must observe the nodes that these lines intersect first on the immatterial line. Nodes from the immatterial line that align with the drawn lines are deemed matterial nodes. Conversely, those nodes that remain unmatched or unaligned are considered immatterial nodes. Line theory asserts that only those nodes from the immatterial line, which align with a node in the matterial line, contribute to the effect. It is noteworthy that any or all of the immatterial nodes can be omitted, and the identical effect will be achieved.

Immatterial nodes may seemingly present themselves as indispensable to an effect from a high-level perspective. However, through the utilization of casting, one can apprehend the peripheral nature of such nodes. Another method of implementing casting is through the process of drifting a line. 'Drifting' is a low-level casting technique wherein a segment of a line is shifted either to the right or left while preserving the seed of the line, in order to ascertain the 'matteriality' of a node. To cast a line through drifting, the following steps are undertaken: 1) Omit one or more nodes from a line. 2) Shift the section of the line originating from the seed to the right or left while maintaining the seed. 3) Observe whether the line seamlessly integrates or if a discontinuity emerges. A discontinuity, termed a 'pit', is a hypothetical scenario where a matterial node is absent, resulting in a hole or disruption in the line. A line containing a pit fails to produce the desired effect. Casting through drifting elucidates that whenever an immatterial node is dropped and a line is drifted, no pit appears in the line, confirming the line's coherence. Conversely, when a matterial node is omitted, a pit arises, introducing a discontinuity in the line. This casting method exposes how only matterial nodes contribute to the effect of a procedure.

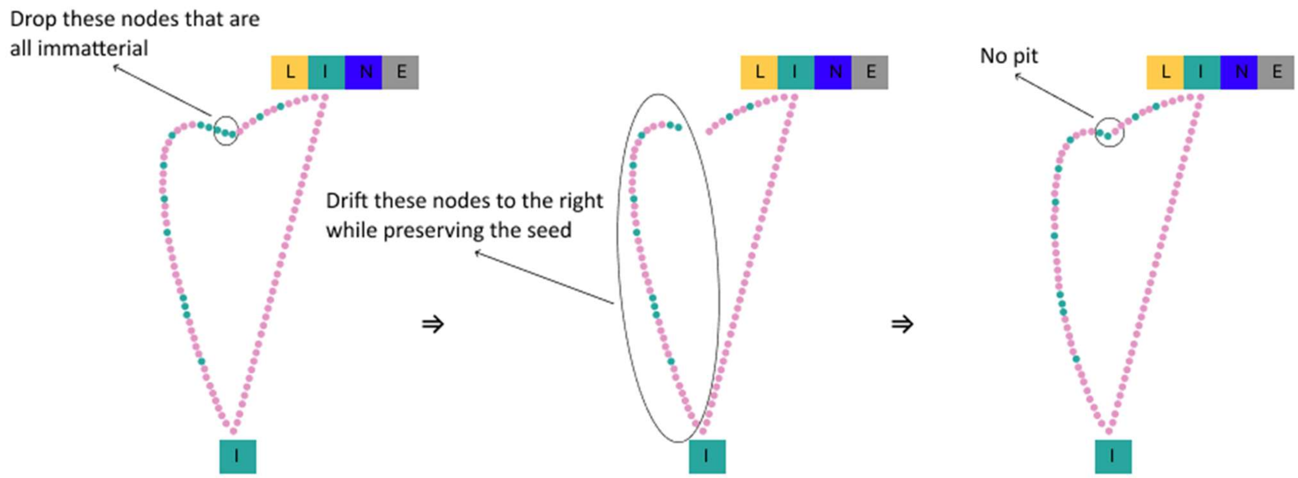

Figure 8. Demonstration of the absence of a pit following an immatterial node drop

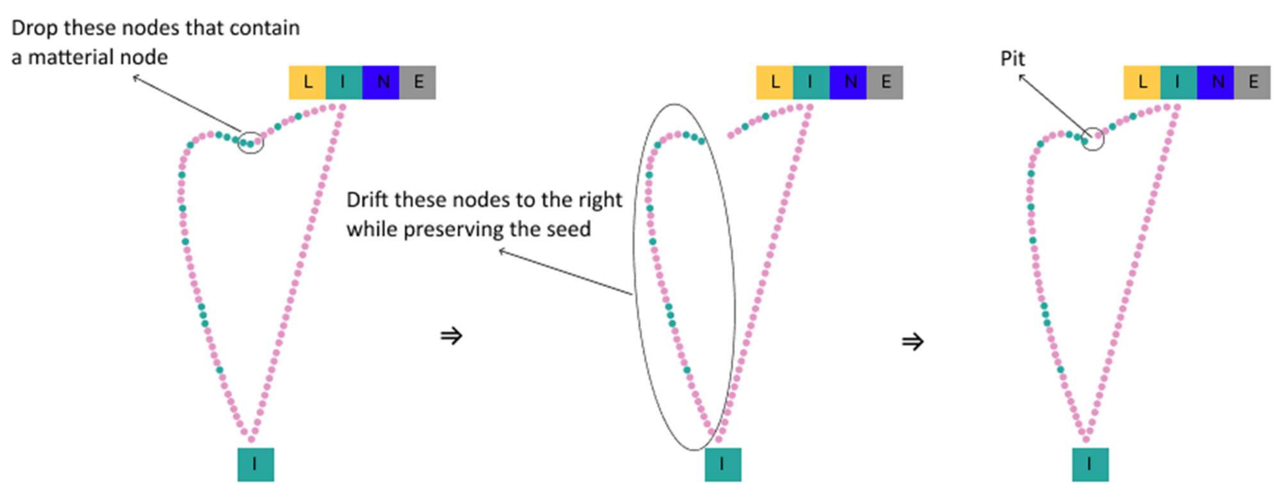

Figure 9. Demonstration of the presence of a pit following a matterial node drop

4. Conclusion

As scholars have extensively investigated the fundamental constituents of matter, this paper introduces line theory as an endeavor to undertake a similar exploration for procedures. According to this theoretical framework, procedures, when examined at the utmost granularity, manifest as movements within space. Similarly, an effect represents the resultant configuration of elements in a specified format subsequent to the execution of a line. The smallest conceivable alteration, referred to as a node in this context, constitutes the elemental building block of any given procedure. A line, characterized by a specific seed and effect, is comprised of nodes, each of which is categorized as either matterial or immatterial. Matterial nodes play a contributory role in determining the effect of a line. Line theory introduces the notion of casting, which involves optimizing a procedure towards a matterial line. This optimization is predicated on the recurrence of identical matterial nodes in every line associated with a particular seed and effect.

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