

STRUCTURAL PATTERNS OF KNOT SEMANTIC LOGIC IN MBOJO PANTUN

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Abstrak. *Mbojo Pantun (Patu Mbojo)* merupakan salah satu bentuk sastra lisan yang berperan penting dalam melestarikan nilai-nilai budaya, ajaran moral, dan kearifan lokal masyarakat Bima, Nusa Tenggara Barat. Penelitian-penelitian sebelumnya umumnya mengkaji *Mbojo Pantun* dari perspektif linguistik, sastra, dan budaya, sedangkan organisasi semantik yang mendasarinya belum banyak dianalisis menggunakan pendekatan matematis. Penelitian ini bertujuan untuk mengidentifikasi pola-pola struktur semantik *Mbojo Pantun* menggunakan kerangka Knot Semantic Logic (KSL). Penelitian menggunakan pendekatan deskriptif kualitatif dengan teknik purposive sampling terhadap pantun yang diperoleh dari sumber-sumber sastra terdokumentasi dan tradisi lisan. Analisis dilakukan melalui identifikasi *knot point*, penyusunan matriks *knot point*, analisis korespondensi semantik rekursif, serta klasifikasi pola struktur berdasarkan prinsip-prinsip Knot Semantic Logic. Hasil penelitian mengidentifikasi empat konfigurasi struktur semantik, yaitu Ring Composition, Chiasm, Parallelism, dan Asymmetrical Semantic Structure (ASS). Ring Composition menunjukkan simetri semantik konsentris yang berpusat pada satu konsep inti, Chiasm memperlihatkan korespondensi semantik berbentuk cermin, sedangkan Parallelism mempertahankan pengulangan semantik secara berurutan. Sebaliknya, Asymmetrical Semantic Structure merepresentasikan perkembangan gagasan secara linear tanpa korespondensi semantik rekursif. Temuan ini menunjukkan bahwa organisasi semantik *Mbojo Pantun* dapat direpresentasikan secara formal melalui struktur matematis, sehingga membuktikan bahwa sastra lisan tidak hanya mengandung nilai estetika dan budaya, tetapi juga memiliki pola semantik yang sistematis. Selain itu, penelitian ini memperluas penerapan Knot Semantic Logic dari pernyataan formal dan wacana keagamaan ke ranah sastra lisan serta mengusulkan Asymmetrical Semantic Structure (ASS) sebagai kategori struktur pelengkap dalam kerangka KSL. Kerangka yang diusulkan memberikan kontribusi terhadap pengembangan linguistik matematis, etnomatematika, dan analisis semantik berbasis matematis untuk mengkaji struktur semantik pada sastra lisan.

Kata Kunci: *Knot Semantic Logic; Mbojo Pantun; sastra lisan; struktur semantik; etnomatematika; linguistik matematis.*

Abstract. *Mbojo Pantun (Patu Mbojo)* is an important form of indigenous oral literature that preserves cultural values, moral teachings, and local wisdom within the Bima community of West Nusa Tenggara, Indonesia. While previous studies have primarily examined *Mbojo Pantun* from linguistic, literary, and cultural perspectives, its underlying mathematical semantic organization remains largely unexplored. This study aims to investigate the structural patterns of *Mbojo Pantun* using the Knot Semantic Logic (KSL) framework. A qualitative descriptive approach was employed by selecting representative pantun through purposive sampling from documented literary sources and oral traditions. The analysis involved identifying semantic knot points, constructing knot point matrices, examining recursive semantic correspondences, and classifying structural configurations according to the principles of Knot Semantic Logic. The results identified four semantic structures: Ring Composition, Chiasm, Parallelism, and Asymmetrical Semantic Structure (ASS). Ring Composition exhibits concentric semantic symmetry centered on a core concept, Chiasm demonstrates mirrored semantic correspondence, and Parallelism preserves sequential semantic repetition. In contrast, Asymmetrical Semantic Structure represents a linear progression of ideas without recursive semantic correspondence. These findings demonstrate that the semantic organization of *Mbojo Pantun* can be formally represented through mathematical structures, revealing that indigenous oral literature embodies systematic semantic patterns beyond its aesthetic and cultural functions. Furthermore, this study extends the application of Knot Semantic Logic from formal statements and religious discourse to traditional oral literature and proposes Asymmetrical Semantic Structure (ASS) as a complementary structural category within the KSL framework. The proposed framework contributes to the development of mathematical linguistics, ethnomathematics, and computational approaches to semantic structure analysis.

Keywords: *Knot Semantic Logic; Mbojo Pantun; oral literature; semantic structure; ethnomathematics; mathematical linguistics.*



A. Introduction

Oral literature constitutes one of the most important forms of indigenous knowledge, preserving cultural values, collective memory, and local wisdom across generations through spoken traditions (Ong, 2002; Robinson, 2003). In Indonesia, oral traditions play a fundamental role in maintaining the identity and cultural heritage of local communities. One of these traditions is Mbojo Pantun (Patu Mbojo), which has long served as a medium for communicating moral values, religious teachings, social norms, educational messages, and philosophical reflections within the Bima community of West Nusa Tenggara. As a form of oral expression, Mbojo Pantun reflects not only linguistic creativity but also the intellectual framework of the society that produced it.

Previous studies have primarily examined oral literature from linguistic, rhetorical, and cultural perspectives, emphasizing discourse organization, narrative coherence, and literary functions (Paltridge, 2006; Meynet, 1998; Robinson, 2003). Within ethnomathematics, research has also demonstrated that mathematical ideas are embedded in various cultural products, including architecture, traditional crafts, and artistic artifacts (Haryanto et al., 2016; Ja'faruddin, 2022; Ja'faruddin, 2024). However, relatively little attention has been devoted to investigating the mathematical organization of semantic structures in oral literature, particularly in traditional pantun. Consequently, the underlying structural principles governing semantic relationships in Mbojo Pantun remain insufficiently understood.

Recent developments in mathematical linguistics have introduced new approaches for analyzing language beyond conventional grammatical and literary interpretations. Rather than viewing language as merely a sequence of words, mathematical approaches seek to identify formal structures, logical relationships, and patterns of semantic symmetry among conceptual units (Chomsky, 2019; Copi & Cohen, 2004). Such perspectives have encouraged interdisciplinary research integrating mathematics, linguistics, and ethnomathematics to reveal hidden structural organizations embedded in traditional knowledge systems (Douglas, 2007; Wacker, 2004).

One mathematical framework that has recently emerged is Knot Semantic Logic (KSL), which models semantic structures through interconnected knot points representing conceptual relationships within a statement (Ja'faruddin et al., 2021a, 2021b). Inspired by principles of knot theory (Atiyah, 1990; Lickorish, 1997; Murasugi, 1996), KSL represents semantic relationships mathematically using knot point matrices and structural transformations. Within this framework, semantic structures are classified according to their patterns of correspondence, including Ring Composition, Chiasm, Parallelism, and Asymmetrical Semantic Structure. These classifications provide a systematic method for identifying semantic organizations that are often difficult to detect using conventional literary analysis alone.

The structural patterns identified by Knot Semantic Logic are closely related to rhetorical organizations that have been widely discussed in literary and scriptural studies. Ring Composition has been recognized as one of the most fundamental principles of textual organization (Douglas, 2007), while Chiasm and Parallelism have been extensively investigated as forms of semantic symmetry in religious and literary texts (Welch, 1995; Farrin, 2010, 2014; Neuwirth, 2006). Nevertheless, these structural concepts have rarely been examined within the context of indigenous oral literature using a formal mathematical framework. Consequently, it remains unclear whether Mbojo Pantun exhibits comparable semantic organizations that can be represented mathematically through Knot Semantic Logic.

This study addresses that research gap by investigating the structural patterns of Knot Semantic Logic in Mbojo Pantun. Rather than focusing exclusively on literary interpretation, the study identifies semantic knot points, constructs knot point matrices, and analyzes the mathematical relationships among semantic units to determine their structural configurations. The analysis seeks to identify whether the semantic organization of Mbojo Pantun exhibits Ring



Composition, Chiasm, Parallelism, or Asymmetrical Semantic Structure based on the principles of Knot Semantic Logic.

This study contributes to the literature in three ways. First, it extends the application of Knot Semantic Logic from formal statements and religious discourse to indigenous oral literature. Second, it demonstrates that the semantic organization of Mbojo Pantun can be represented through mathematical structures, thereby strengthening the interdisciplinary relationship between mathematics, linguistics, and literary studies. Third, the study proposes Asymmetrical Semantic Structure as a complementary structural category within the Knot Semantic Logic framework, providing a broader perspective for analyzing semantic organizations in traditional oral literature and enriching the field of ethnomathematics.

B. Methodology

This study employed a qualitative descriptive research design to investigate the structural patterns of Knot Semantic Logic (KSL) in Mbojo Pantun (Patu Mbojo). A qualitative approach was considered appropriate because the primary objective was to identify and classify the mathematical organization of semantic relationships embedded in the pantun rather than to evaluate their linguistic or literary interpretations (Paltridge, 2006). The study adopted the perspective that semantic structures can be systematically represented through mathematical models, enabling the identification of hidden structural patterns within traditional oral literature (Chomsky, 2019; Ja'faruddin et al., 2021a).

The primary data consisted of selected Mbojo Pantun obtained from documented literary sources and oral traditions of the Bima community in West Nusa Tenggara, Indonesia. A purposive sampling technique was employed to select pantun containing complete semantic structures and representing various themes, including education, morality, religion, leadership, social life, and cultural wisdom. Each pantun was treated as an independent unit of analysis because it possesses its own semantic organization and structural coherence (Douglas, 2007).

The analytical procedure followed the theoretical framework of Knot Semantic Logic proposed by Ja'faruddin et al. (2021a, 2021b) and consisted of five sequential stages.

First, each pantun was segmented into knot points, where each knot point represented a complete semantic unit or conceptual proposition. This segmentation emphasized semantic completeness rather than grammatical boundaries, allowing each knot point to function as a basic analytical element.

Second, semantic relationships among the identified knot points were examined to determine patterns of correspondence, repetition, contrast, and conceptual complementarity. These semantic correspondences formed the basis for identifying structural symmetry within the pantun, consistent with the principles of Ring Composition, Chiasm, and Parallelism described in rhetorical studies (Douglas, 2007; Welch, 1995; Farrin, 2014).

Third, the semantic structure of each pantun was represented mathematically using a Knot Point Matrix.

Let

$$A = \begin{bmatrix} K_1 \\ K_2 \\ \vdots \\ K_n \end{bmatrix},$$

where K_i denotes the i -th knot point and n represents the total number of knot points. A semantic structure satisfies the principles of Knot Semantic Logic if there exists a transformation matrix M such that

$$MA = A',$$

where A' denotes the transformed semantic structure after the correspondence among knot points has been established (Ja'faruddin et al., 2021a).

The fourth stage involved classifying each pantun according to its semantic configuration. Based on the correspondence among knot points, the structures were categorized into Ring Composition, Chiasm, Parallelism, Parallelism with Center, and Asymmetrical Semantic Structure. This classification was based on the degree of semantic symmetry exhibited by the knot point correspondences and their mathematical organization (Douglas, 2007; Farrin, 2014).

Finally, the identified structural patterns were interpreted to explain how their mathematical organizations support the transmission of moral, educational, religious, and cultural messages embedded within the pantun. This interpretation integrated mathematical representation with semantic meaning, thereby providing a comprehensive understanding of the structural organization of *Mbojo Pantun*.

To enhance the reliability of the analysis, the identification of knot points, construction of knot point matrices, and structural classification were conducted iteratively. Each semantic relationship was repeatedly examined to ensure consistency between conceptual interpretation and mathematical representation. This iterative verification process strengthened the validity of the structural classification and ensured that every identified pattern accurately reflected the theoretical principles of Knot Semantic Logic while preserving the semantic integrity of the original *Mbojo Pantun* (Wacker, 2004; Ja'faruddin et al., 2021b).

C. Results and Discussion

1. Structural Patterns of Knot Semantic Logic in Mbojo Pantun

The structural analysis of the selected *Mbojo Pantun* identified four semantic configurations based on the principles of Knot Semantic Logic (KSL). Three of the analyzed pantun satisfy the mathematical properties of KSL, namely Ring Composition, Chiasm, and Parallelism, whereas one pantun does not exhibit the semantic symmetry required by the theory. These findings indicate that although Mbojo Pantun generally employs well-organized semantic structures, not every pantun follows a mathematically symmetrical pattern. The identified structures are presented in Tables 1–4.

a. Non-Knot Semantic Logic Structure

The first pantun represents a semantic organization that does not satisfy the structural requirements of Knot Semantic Logic. As presented in **Table 1**, six knot points were identified, representing the concepts of good values, social values, discussion, discussion outcome, the value of actions, and the value of words.

Table 1. Structural Representation of a Non-Knot Semantic Logic Pattern

Code	Original Mbojo Pantun	English Translation	Knot Point
A ₁	<i>Waraku motto mone'i ra tahu samata</i>	There is a motto that is good and appropriate.	Good values
A ₁ '	<i>Motto daerah mori kai ngaha ma ore</i>	The regional motto serves as guidance for many people.	Good values for society
A ₂	<i>Hasil mbola ra dampa wara kai daerah Dompu ederu</i>	The discussion resulted in the establishment of the Dompu regional motto.	Discussion
A ₂ '	<i>Ngahi rawi pahu... au au la ngahi musti di kanggihi</i>	Whatever is spoken must be carried out.	Discussion outcome
A ₃	<i>Au au la rawi kantau weamu rawum</i>	Whatever is done must have value.	Value of actions
A ₃ '	<i>Au au la pehe kantau pahimu</i>	Whatever is spoken must be proven.	Value of words



The first pantun represents an asymmetrical semantic structure, indicating that the semantic relationships among the identified knot points do not satisfy the recursive correspondence required by Knot Semantic Logic. As presented in Table 1, six knot points were identified, corresponding to the concepts of good values, good values for society, discussion, discussion outcome, value of actions, and value of words.

The semantic structure can be represented as the following Knot Point Matrix:

$$A = \begin{bmatrix} A_1 \\ A'_1 \\ A_2 \\ A'_2 \\ A_3 \\ A'_3 \end{bmatrix}$$

where each element represents a complete semantic unit extracted from the pantun.

According to the Knot Semantic Logic framework, a semantic structure satisfies the mathematical requirement if there exists a transformation matrix M such that

$$MA = A',$$

where A' denotes the transformed semantic structure exhibiting recursive semantic correspondence among the knot points. For the pantun presented in Table 1, however, no transformation matrix can be constructed that produces a structurally symmetric correspondence. Instead, the semantic sequence develops as

$$A_1 \rightarrow A'_1 \rightarrow A_2 \rightarrow A'_2 \rightarrow A_3 \rightarrow A'_3.$$

The semantic progression shows that each knot point introduces a subsequent idea without returning to or reinforcing previous semantic units. Consequently, the mapping

$$A_1 \leftrightarrow A'_3, A'_1 \leftrightarrow A_3, A_2 \leftrightarrow A'_2$$

cannot be established, and no recursive transformation satisfying

$$MA = A'$$

exists.

Therefore, the semantic organization cannot be represented by the symmetric transformations that characterize Ring Composition, Chiasm, or Parallelism. Instead, the pantun exhibits an Asymmetrical Semantic Structure, in which meaning develops cumulatively through a linear progression of interconnected semantic units. This finding demonstrates that the semantic organization of *Mbojo Pantun* is not universally governed by symmetry; rather, some pantun communicate their messages through a progressive expansion of ideas without recursive structural correspondence.

b. Ring Composition Structure

The semantic structure can be represented by the following Knot Point Matrix:

$$A = \begin{bmatrix} A_1 \\ A_2 \\ A_3 \\ A'_2 \\ A'_1 \end{bmatrix}$$

where each element represents a complete semantic unit extracted from the pantun.

According to the Knot Semantic Logic framework, a semantic structure satisfies the mathematical requirement when there exists a transformation matrix M such that

$$MA = A',$$

where A' denotes the transformed semantic structure exhibiting recursive semantic correspondence among the knot points.



For the pantun presented in Table 2, the semantic sequence is represented as

$$A_1 \rightarrow A_2 \rightarrow A_3 \rightarrow A'_2 \rightarrow A'_1.$$

Unlike the previous example, this semantic organization exhibits a recursive correspondence among the knot points. The outer knot points,

$$A_1 \leftrightarrow A'_1,$$

are semantically connected through the concept of place, while the intermediate knot points,

$$A_2 \leftrightarrow A'_2,$$

correspond through the concept of effort. The central knot point,

$$A_3,$$

represents the strongest desire to seek knowledge and functions as the semantic center around which the entire structure is organized.

Because the semantic correspondences satisfy the recursive transformation expressed by

$$MA = A',$$

the pantun forms a concentric semantic organization consistent with the principles of Ring Composition. The mathematical symmetry demonstrates that the journey toward knowledge is framed by perseverance, in which physical movement and personal effort converge on a single educational objective before returning to the corresponding semantic elements. This concentric arrangement highlights that the pursuit of knowledge is presented not merely as a sequence of events but as a balanced semantic structure centered on determination and continuous effort.

c. Chiasm Structure

The third structural pattern identified in this study is Chiasm, characterized by mirror symmetry between the opening and closing semantic units.

Table 3. Structural Representation of Chiasm in the "Encouragement to Learn" Mbojo Pantun

Code	Original Mbojo Pantun	English Translation	Knot Point
A ₁	<i>Sawajipu ba na'e na kaomu konenti tanda'o</i>	Before children grow up, encourage them to study diligently.	Advice
A ₂	<i>Baca, tunti ro reke na wa'u si loa kaomu tanda'o wali mada lai</i>	Once children are able to read, write, and count, they should continue learning other knowledge.	Provision for life
A' ₂	<i>Waraku ndei osu na mori baing da sa esa</i>	Knowledge becomes a provision that helps people avoid hardship in life.	Provision
A' ₁	<i>Loa kaing mori, ma biri ro ma moro</i>	Education enables a prosperous and sufficient life.	Result of the advice

The semantic structure can be represented by the following Knot Point Matrix:

$$A = \begin{bmatrix} A_1 \\ A_2 \\ A'_2 \\ A'_1 \end{bmatrix}$$

where each element represents a complete semantic unit extracted from the pantun.

According to the Knot Semantic Logic framework, a semantic structure satisfies the mathematical requirement when there exists a transformation matrix M such that

$$MA = A',$$

where A' denotes the transformed semantic structure exhibiting recursive semantic correspondence among the knot points.

For the pantun presented in Table 3, the semantic sequence is represented as

$$A_1 \rightarrow A_2 \rightarrow A'_2 \rightarrow A'_1.$$



The semantic organization exhibits a mirrored correspondence between the outer and inner knot points. The outer knot points,

$$A_1 \leftrightarrow A'_1,$$

are connected through the relationship between educational advice and its positive outcome, whereas the inner knot points,

$$A_2 \leftrightarrow A'_2,$$

correspond through the concept of education as a lifelong provision. Unlike Ring Composition, this structure does not contain a central semantic unit. Instead, the recursive correspondence is achieved through a balanced mirror arrangement between the outer and inner semantic components.

Because these semantic correspondences satisfy the recursive transformation expressed by

$$MA = A',$$

the pantun conforms to the structural principles of Chiasm in Knot Semantic Logic. The mirrored organization emphasizes the causal relationship between educational guidance and its beneficial consequences, while the central semantic correspondence reinforces the role of knowledge as a lasting provision for life. This balanced structure demonstrates how semantic symmetry is employed to strengthen the educational message conveyed in the pantun.

d. Parallelism Structure

The final structural configuration identified in this study is Parallelism. In this pantun, the semantic sequence introduces the concept of leadership followed by the responsibilities associated with leadership. These concepts are then repeated in the same order, producing a sequential semantic correspondence.

Table 4. Structural Representation of Parallelism in the Leadership Mbojo Pantun

Code	Original Mbojo Pantun	English Translation	Knot Point
A ₁	<i>Tanda ro pata si, ba ndajita rawina Bupati</i>	Recognize and understand the role of the Regent.	Occupation
A ₂	<i>Tituana tuka, kalampana dua mbua taki</i>	A leader should perform all assigned responsibilities wholeheartedly.	Performing duties
A' ₁	<i>Dua mbua taki, Bupati malabo jena teke</i>	The Regent and the Crown Prince should properly carry out their responsibilities.	Occupation
A' ₂	<i>Taki ndei kalampa, kai mamasi ro malumpi</i>	Duties should be carried out in an orderly and disciplined manner.	Performing duties

e. The semantic structure can be represented by the following Knot Point Matrix:

$$A = \begin{bmatrix} A_1 \\ A_2 \\ A'_1 \\ A'_2 \end{bmatrix}$$

where each element represents a complete semantic unit extracted from the pantun.

According to the Knot Semantic Logic framework, a semantic structure satisfies the mathematical requirement when there exists a transformation matrix M such that

$$MA = A',$$

where A' denotes the transformed semantic structure exhibiting recursive semantic correspondence among the knot points.

For the pantun presented in Table 4, the semantic sequence is represented as



$$A_1 \rightarrow A_2 \rightarrow A'_1 \rightarrow A'_2.$$

The semantic organization exhibits sequential correspondence between the knot points. The first and third knot points,

$$A_1 \leftrightarrow A'_1,$$

are semantically connected through the concept of leadership, whereas the second and fourth knot points,

$$A_2 \leftrightarrow A'_2,$$

correspond through the concept of performing duties and responsibilities. Unlike Chiasm, which relies on mirrored correspondence, and Ring Composition, which is organized around a central semantic unit, the semantic symmetry in this pantun is established through the repetition of equivalent concepts in the same sequential order.

Because these semantic correspondences satisfy the recursive transformation expressed by

$$MA = A',$$

the pantun conforms to the structural principles of Parallelism in Knot Semantic Logic. The sequential semantic organization reinforces the close relationship between leadership and responsibility, emphasizing that effective leadership is demonstrated not only through authority but also through the consistent fulfillment of duties with discipline, accountability, and integrity.

2. Comparative Discussion

The comparative analysis reveals that the four structural configurations identified in *Mbojo Pantun* represent different levels of semantic organization within the Knot Semantic Logic (KSL) framework. Ring Composition exhibits the highest degree of semantic symmetry because all corresponding knot points are recursively organized around a central semantic unit. This finding is consistent with Douglas (2007), who described Ring Composition as a concentric rhetorical structure in which the central element functions as the thematic focus of the entire discourse. Similarly, Farrin (2010, 2014) demonstrated that ring structures provide textual coherence by organizing semantic units around a balanced central concept.

In contrast, Chiasm establishes semantic symmetry through mirrored correspondence rather than through a semantic center. The reciprocal relationships between the outer and inner knot points are consistent with classical rhetorical analyses of chiasmus reported by Welch (1995) and Meynet (1998), who argued that mirrored semantic arrangements strengthen coherence and reinforce the central message of a text. Unlike Ring Composition, Chiasm achieves balance through inversion rather than concentric organization.

The Parallelism structure differs from both Ring Composition and Chiasm by preserving the original semantic order while repeating equivalent conceptual units. This sequential correspondence agrees with the observations of Neuwirth (2006), who emphasized that parallel structures reinforce meaning through repetition rather than inversion. In the analyzed pantun, the repeated concepts of leadership and responsibility create semantic reinforcement without altering the original sequence of ideas.

A different pattern emerges in the Asymmetrical Semantic Structure (ASS). Unlike the previous three configurations, ASS does not establish recursive semantic correspondence among knot points. Instead, the semantic units develop progressively through a cumulative sequence of ideas. Although this structure lacks mathematical symmetry, it nevertheless preserves semantic coherence through logical progression. This observation indicates that semantic organization in *Mbojo Pantun* is not exclusively dependent on symmetrical correspondence but may also emerge through continuous conceptual development.

From a mathematical perspective, the comparison among these four structures demonstrates different transformation properties within the Knot Semantic Logic framework. Ring Composition, Chiasm, and Parallelism satisfy the recursive transformation expressed by

$$MA = A',$$



because the semantic correspondences among knot points generate identifiable structural mappings. In contrast, the Asymmetrical Semantic Structure does not satisfy this transformation since no recursive mapping exists among the semantic units. Consequently, the four configurations may be interpreted as different mathematical classes of semantic organization rather than merely different literary styles.

Compared with previous studies, which applied Knot Semantic Logic primarily to formal statements and Qur'anic discourse (Ja'faruddin et al., 2021a, 2021b), this study demonstrates that the framework is equally applicable to indigenous oral literature. Furthermore, while previous rhetorical studies have discussed Ring Composition, Chiasm, and Parallelism as literary phenomena (Douglas, 2007; Farrin, 2014; Meynet, 1998), the present study extends these concepts by representing them through knot point matrices and mathematical transformations. The introduction of Asymmetrical Semantic Structure (ASS) further enriches the classification of semantic patterns within the Knot Semantic Logic framework, suggesting that semantic organization should be viewed as a continuum ranging from highly symmetrical to progressively linear structures.

These findings provide empirical evidence that mathematical reasoning is embedded in the semantic organization of indigenous oral traditions. By integrating knot point matrices with rhetorical analysis, Knot Semantic Logic establishes a quantitative and structural approach to investigating oral literature, thereby strengthening the interdisciplinary relationship among mathematics, linguistics, literary studies, and ethnomathematics.

D. Conclusion

This study demonstrates that Knot Semantic Logic (KSL) provides a systematic mathematical framework for revealing the underlying semantic structures of *Mbojo Pantun*. Four structural configurations were identified: Ring Composition, Chiasm, Parallelism, and Asymmetrical Semantic Structure (ASS). Ring Composition, Chiasm, and Parallelism exhibit distinct forms of semantic symmetry through concentric, mirrored, and sequential correspondences among knot points, whereas Asymmetrical Semantic Structure reflects a linear progression of ideas without recursive semantic correspondence.

The findings indicate that the semantic organization of *Mbojo Pantun* can be represented mathematically through knot point matrices and structural transformations, demonstrating that indigenous oral literature embodies systematic semantic structures beyond its aesthetic and cultural functions. By extending the application of Knot Semantic Logic from formal statements and religious discourse to traditional oral literature, this study broadens the scope of mathematical linguistics and ethnomathematics.

Furthermore, this study proposes Asymmetrical Semantic Structure (ASS) as a complementary structural category within the Knot Semantic Logic framework. This classification enriches the theoretical development of KSL by accommodating semantic organizations that are coherent yet non-recursive, providing a broader mathematical perspective for analyzing indigenous texts and other forms of traditional discourse. The proposed framework offers a foundation for future research on mathematical representations of semantic structures across diverse languages, oral traditions, and literary genres.

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