

# The New Viridian Journal of Arts, Humanities and Social Sciences

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Vol. 2 No. 3 (2022): The New Viridian Journal of Arts, Humanities and Social Sciences ( May - June 2022)

## Vol. 2 No. 3 (2022): The New Viridian Journal of Arts, Humanities and Social Sciences ( May - June 2022)



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The New Viridian Journal of Arts, Humanities and Social Sciences



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นโยบายการคุ้มครองข้อมูลส่วนบุคคล

## การจำแนกกลุ่มชาติพันธุ์ในลวดลายผ้าทอของซัมบาตะวันออก

### Identification of Ethnomathematics in East Sumba's Woven Fabric Motifs

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Erwin Ardianto Halim\*

#### บทคัดย่อ

บทคัดย่อ งานวิจัยครั้งนี้คือการระบุลักษณะชาติพันธุ์ลวดลายของผ้าทอของซัมบาตะวันออก เป็นวิธีการวิจัยเชิงพรรณนา เชิงคุณภาพ ด้วยวิธีการทางชาติพันธุ์วิทยา การศึกษาวิจัยเกี่ยวกับกิจกรรมทางชาติพันธุ์บนผ้าทอในจังหวัดซุมบาฝั่งตะวันออก ในการศึกษาจะอธิบายตามประเภทของลวดลายผ้าทอจากภาคตะวันออกซึ่งแสดงถึงแนวคิดทางคณิตศาสตร์และเรขาคณิต เช่น รูปสี่เหลี่ยมขนมเปียกปูน และรูปสามเหลี่ยม ซึ่งพบได้ในลวดลายสัตว์ ลวดลายมูมาลี และลวดลายดอกไม้

ดังนั้นผลการวิจัยของการศึกษานี้สามารถนำมาใช้เพื่อแสดงให้เห็นว่าลวดลายแบบดั้งเดิมได้นำแนวคิดทางคณิตศาสตร์ไปใช้ในการสร้างสรรค์ผลงาน และสามารถนำผลการวิจัยนี้ไปใช้อ้างอิงในการพัฒนาสื่อการสอนคณิตศาสตร์ และหลักสูตรการออกแบบภายใน สถาปัตยกรรมตามภูมิปัญญาท้องถิ่นด้วยวิธีการทางชาติพันธุ์

**คำสำคัญ :** คณิตศาสตร์ชาติพันธุ์, ชาติพันธุ์วิทยา, ผ้าทอซุมบาตะวันออก, ลวดลายผ้า

\* Universitas Kristen Maranatha Bandung / erwin.ardianto@art.maranatha.edu

## Abstract

The purpose of this research is to identify ethnomathematics in the motifs of East Sumba's woven fabrics. It is a qualitative descriptive research method with an ethnographic approach. Data on ethnomathematical activity on woven cloth in East Sumba are presented in this study. While analyzing the data in this study, the motif data on the woven cloth of East Sumba will be described according to their category using interview techniques and literature studies. According to the findings of this study, the motifs of woven cloth from East Sumba depict mathematical and geometric concepts such as rhombuses and triangles, which can be found in animal motifs, *mamuli* motifs. Thus, the findings of this study can be used to demonstrate that traditional motifs have involuntarily implemented mathematics in the creation of works. the purpose of this research is to explore and examine the mathematical elements or mathematical concepts in the ikat weaving of East Sumba. Thus, the results of this research can later be used as a reference for the development of mathematics teaching materials and interior design/architecture courses based on local wisdom with an ethnomathematical approach. Therefore, it is necessary to conduct a research entitled Identification of Ethnomathematics in East Sumba's Woven Fabric Motifs

**Keywords:** Ethnomathematics, East Sumba, Woven Fabric Motifs,

## Introduction

Sumba woven fabrics have distinct colors and motifs, particularly in West and East Sumba woven fabrics (Ledi et al., 2020). Sumba Woven Fabric, the traditional woven fabric of East Sumba, is one of the cultural products that have been influenced by tourism activities. This is demonstrated by the findings of Biranul Anas' dissertation research in 2007, which examined changes in one type of weaving in particular, namely the *Hinggi* woven fabrics from East Sumba. *Hinggi* woven fabrics can be traced back to the post-independence period and up to the year 2000. Aside from changes in visual style over the last decade, traditional weaving from the East Sumba region has received a lot of attention due to the uniqueness of the motifs and processes that involve nature as well as being manufactured manually. The motifs of East Sumba's woven fabrics have a variety of meanings and forms, such as fauna motifs with images of crocodiles, which represent greatness, magic, and great influence (BKAD, Umalulu District and Amos Australia 2019). Patula Ratu motif is a geometric, continuous, hooked, symmetrical, harmonious, and beautiful geometric motif that is usually placed in the center of the woven fabric; this motif is

only used by Queen. The meanings and values in the Sumba cloth motif are cultural values that are based on noble values.

Ethnomathematics is a bridge between culture and mathematics. It was founded in 1977 by a Brazilian scientist named Ubiratan D'Ambrosio. It is an idea that uses socio-cultural aspects in mathematics learning in order to understand mathematics in terms of adapting and expressing the relationship between culture and mathematics (Bili et al., 2019). Ethnomathematics refers to a variety of mathematical activities owned or developed by a community, including mathematical concepts such as cultural heritage in the form of temples and inscriptions, pottery and traditional tools, local units, batik and embroidery motifs, traditional games, and patterns of community settlements. Ethnomathematics refers to the results of a tribe's activities in which there are mathematical concepts that are sometimes disregarded by the community (Setiawan & Listiana, 2021).

According to the above-mentioned expert's explanation, ethnomathematics is a summary of thoughts and practices developed in a culture as a result of their respective activities, particularly in the motifs of woven cloth in East Sumba.

Based on the background explanation above, the purpose of this research is to explore and examine the mathematical elements or mathematical concepts in the ikat weaving of East Sumba. Thus, the results of this research can later be used as a reference for the development of mathematics teaching materials and interior design/architecture courses based on local wisdom with an ethnomathematical approach. Therefore, it is necessary to conduct a research entitled Identification of Ethnomathematics in East Sumba's Woven Fabric Motifs.

### Objective

- 1) To Investigate the Niche of Motifs of East Sumba's Woven Fabric
- 2) To address the connection between ethnomathematics and culture, focusing on woven fabric motifs in East Sumba.
- 3) To be reference for the development of mathematics teaching materials and interior design/architecture courses based on local wisdom with an ethnomathematical approach.
- 4) To create new paradigm for young interior designers in understanding cultural mathematics, because culture and mathematics are very closely related

## Methodology

This is a qualitative study with an ethnographic approach that investigates and studies the ikat motifs on East Sumba's woven fabric. This investigation focuses on East Sumba woven fabric. The information was gathered through literature review and documentation. The data collected in this study were processed using qualitative data analysis techniques, which included data collected during the data reduction, data presentation, and conclusion drawing processes (Sugiyono, 2019).

## Literature Reviews

### East Sumba Woven Fabric



Figure 1: East Sumba Woven Fabric

Source: google.com

East Sumba Woven Fabric is classified as weft weaving based on its manufacturing method. In addition to the *ikat* method, there is also *pahikung* weaving, which uses a manufacturing method such as *songket*. Unlike *ikat (Hinggi)* weaving, *pahikung* weaving is exclusively for women, and the woven products are sewn together to form a sarong. Sumba weaving is distinguished by its manufacturing process, shape, pattern, and color (Adams, 1972; Anas, 2007; Ningsih, 2019). The weaving process is related to the formation of the fetus in the womb, with warp threads forming a protective skin, weft threads forming body parts, and interwoven threads forming cloth symbolizing growth to adulthood (Jay, 2014: 111). Sumba weaving's color is produced through the cold dyeing method, with blue coming from *tarum* dye and red from *noni*, which uses a mixture of wood and *loba* leaves to produce a Sumba-specific red color (Ramone, 2013). East region weaving is classified into three types as follows: (Meldi, 2019)

1. Plain woven fabric without motif in white or black.

2. Ikat is a woven fabric whose color is obtained by tying a collection of threads to form a specific image or pattern, then untying and weaving the threads. Ikat weave is more productive (*hinggi*), and it is used for men's clothing. Ikat weaving includes motifs such as horses, chickens, parrots, people, war monuments, and others that have meaning and understanding in the context of East Sumba's life pattern.

3. *Songket* woven (*pahikung*) is a woven fabric with motifs and images obtained through *songket/hikung*, specifically by copying the *pahudu* motif onto a woven fabric and then weaving it. *Songket* weaving produces more sarongs.



Figure 2 A. Fabric, B. Sarong, C. Shawl (from left from right)

Source: (Murniati, M., & Takandjandji, M. (2016)

Based on the findings of the research, interviews, and documentation, East Sumba's Woven Fabric has distinct patterns that can be explained as follows:

A. Animal and symbolic motifs

1. Crocodile motifs (*Wuya*)



Figure 3: Crocodile Motifs (*Wuya*) at Hinggu

Source: Meldi, 2019



Crocodile patterns (*Wuya*) are used as a symbol of magic, greatness, and influence. Crocodile motifs were chosen by the Sumba people for Kings and Queens (BKAD Kecamatan Umalulu (District) and Amos Australia 2019).

## 2. Tortoise Patterns (*Karawulangu*)



Figure 4: Tortoise Motifs (*Karawulangu*)

Source: Meldi, 2019

The tortoise Patterns (*karawulangu*) are similar to the crocodile motif in that they both represent wisdom and greatness. (BKAD Umalulu District and Amos Australia 2019)

## 3. The Lion Motifs (*Mahang*)



Figure 5: Lion Motifs (*Mahang*)

Source: Meldi, 2019

The Lion Patterns are influenced by Europe's Renaissance Style, which began during King Henry III's reign in the mid-XVI century. It arrived in Indonesia via Hindu culture.

In general, there are no lions on East Sumba. It is used as a woven fabric pattern to show that the Sumbanese has recognized interaction with the outside world. (BKAD Umalulu District and Amos Australia 2019)

#### 4. The Parrot Motifs



Figure 6: Cockatoo Motifs

Source: Meldi, 2019

The Cockatoo Motifs represent unity and oneness, and they reflect the Sumbanese people's soul when making decisions on various matters. (BKAD Umalulu District and Amos Australia 2019)

#### 5. The Rooster Patterns (*Manu*)



Figure 7: Rooster Motifs (*Manu*)

Source: Meldi, 2019

The Rooster Motifs represent awareness, as the rooster always crows before sunrise, waking people up in the morning. It is also a virility symbol, a sign of life, and a

protective leader. Roosters are raised specifically for use as sacrificial animals in traditional *Marapu* rituals. (BKAD Umalulu District and Amos Australia 2019)

#### 6. The Horse Motifs (*njara*)



Figure 8: Horse Motifs (*Njara*)

Source: Meldi, 2019

The Horse Motifs represent masculinity, courage, agility, and heroism. Horses are used for transportation and military purposes and have a high economic value as well for the Sumbanese people. The horse is an important symbol in Sumba culture, both in marriage customs and as a vehicle symbol in funeral rituals. (BKAD Umalulu District and Amos Australia 2019).

#### B. Geometric Motifs

##### 1. *Patula Ratu* Motifs



Figure 9: *Patula Ratu* Motifs

Source: Meldi, 2019

Patula Ratu is a geometric, continuous, hooked, symmetrical, harmonious, and beautiful motif that is usually placed in the center of the woven fabric. Queen is the only one who uses this motif. (BKAD Umalulu District and Amos Australia 2019)

## 2. Mamuli Motifs



Figure 10: Mamuli Motifs

Source: Meldi, 2019

The Mamuli Motifs are a motif shaped symbolizes female genital that represents Sumba women's honor and fertility. (BKAD Umalulu District and Amos Australia 2019).

## Result and Discussion

### Etnomathematics



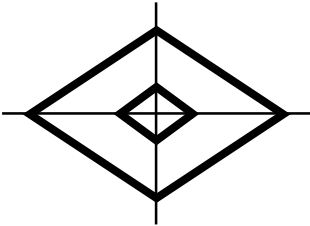
Ethnomathematics, according to Paul Gerdes (2001), is the exploration and analysis of geometric concepts in wall decorations in Lesotho and other parts of South Africa (Gerdes, 1999). Sotho women frequently use symmetrical decorations to decorate their walls. Litema owns the rights to this work. The decorations classified as Litema produce mutually symmetrical shapes. This result stems from cultural history, allowing mathematics to take various forms and evolve following the development of the society that employs it. Broad mathematical concepts related to the use of various activities within the community, such as grouping, counting, measuring, designing buildings or tools, playing, determining locations, creating settlement patterns, and so on.

### Mathematical Concepts

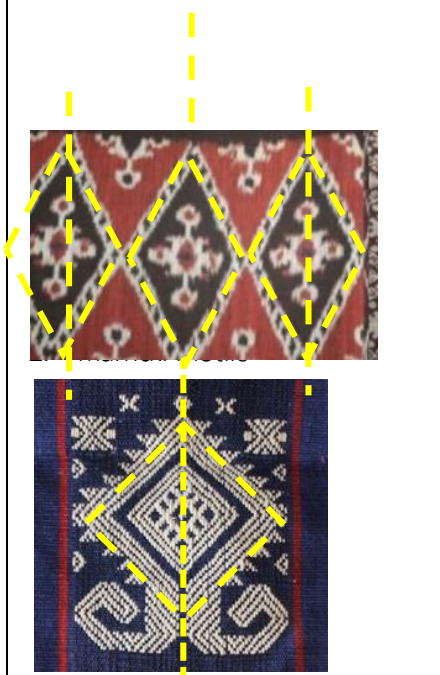
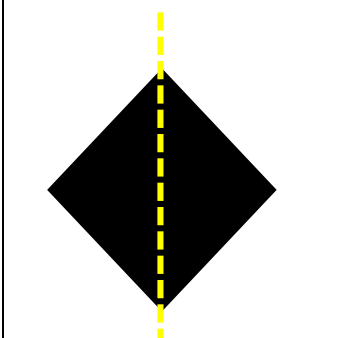
The concept in question is an abstract idea that is used to classify several objects, elaborate on them with knowledge, and then use it to group and name some of these objects (Setiawan & Listiana, 2021). The process of creating a work, particularly the motifs on the East Sumba woven fabric, generates a concept and a name, and thus the motif of the East Sumba woven fabric becomes a tool for introducing mathematical concepts that we are familiar with, the geometric concepts that help us identify abstract ideas such as lines, triangles, rhombuses, symmetrical, and parallel. The following is the mathematical concept underlying the East Sumba woven fabric motif:






#### Mathematical concepts and mathematical geometry in East Sumba weaving motifs (Ethnomathematics)

The ethnomathematical concept contained in the East Sumba woven fabric motif can vary depending on its shape. Mathematical concepts are expected to be described in the cultural motifs. The following is a description of the Mathematical concept found in East Sumba woven fabric motifs:

Name of the Motif and the Figure	Ethnomathematical Concept with Rhombus Geometric Shapes	Description
<p>1. Crocodile motifs (<i>Wuya</i>)</p>  <p>2. Tortoise Motifs (<i>Karawulangu</i>)</p> 		<p>The geometric shape of the rhombus can be found in the typical motifs of East Sumba woven fabric, such as the crocodile motif, turtle motif, and floral motif, which is dominated by white.</p> <p>This rhombus's shape intersects in the middle perpendicular to each other. There are rhombus shapes of various sizes in the crocodile motif,</p>

		<p>tortoise motif these rhombus shapes and lines are joined to form a distinct motif.</p>
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Name of the Motif and the Figure	Ethnomathematical Concept with Triangle and Symmetrical Fold Concept	Description
<p>1. <i>Patula Ratu</i> Motifs</p> 		<p>The Rhombus concept is frequently used in the motifs of woven fabrics in East Sumba, particularly in the <i>Patula Ratu</i> and <i>Mamuli</i> motifs, which are specially designed for Sumba women and represent female fertility. This triangle motif can also be found on East Sumba's woven fabric.</p> <p>Symmetrical fold shown with a yellow dotted line represents a mature mathematical concept in which the two parts of the fold close symmetrically to each other if the <i>mamuli</i> motif is folded according to the yellow line. Additionally, the triangle is the most stable geometric shape.</p>

Name of the Motif and the Figure	Ethnomathematical Concept with Symmetrical Concepts and Reflective mathematical Concepts	Description
<p>1. The Lion Motifs (<i>Mahang</i>)</p> 		<p>The idea of symmetrical black lines and reflective mathematical concepts are identified in the properties of woven fabrics, specifically: Lion Motifs, Horse motifs, dan Rooster motifs</p> <p>The transfer or shift of all object points in the same direction with the same distance is referred to as the reflective mathematical concept (Purnama et al., 2020). The lion and horse motifs, which are separated by geometric motifs or are not separated by other forms, clearly demonstrate the symmetric and reflective mathematical concepts. The X and Y lines, depicted with black lines, are also similar to the motifs on East Sumba's woven fabric.</p>
<p>2. The Horse Motifs (<i>njara</i>)</p> 		
<p>3. The Rooster Motifs (<i>Manu</i>)</p> 		

## Conclusion

Based on the findings and discussions, it is possible to conclude that the East Sumba woven fabric motif has very authentic and iconic characteristics, as well as a very deep meaning:

1. Reflective and symmetrical Ethnomathematic concepts are frequently found in animal motifs on East Sumba woven fabrics with very good and precise ethnomathematic concepts.

2. The most common ethnomathematical elements found in East Sumba woven fabrics are flat shapes such as Rhombus

3. Geometric transformations such as reflections, Symmetrical weaving, reverse weaving like reflections in a mirror on animal motifs were also discovered in this study.

With the study above, it can help lecturers teaching culture and mathematics understand the relationship between mathematics and culture that has existed for a long time, especially in East Sumba woven motifs and adds a new paradigm for young interior designers.



## References

- Ambrosio, U. D. (1985). Ethnomathematics and its Place in the History and Pedagogy of Mathematics. *For the Learning of Mathematics*, 5(1), 44–48.
- ANAS, B. (2007). TOURISM AND THE HINGGI DESIGN OF EAST SUMBA: A STUDY ON THE AESTHETICAL MORPHOLOGY OF COLORS AND MOTIFS OF TRADITIONAL CLOTHS. *ASEAN Journal on Hospitality and Tourism*. <https://doi.org/10.5614/ajht.2007.6.1.02>
- Bili, F. M., Sujadi, A. A., & Arigiyati, T. A. (2019). Identifikasi Etnomatematika pada Motif Kain Tenun Sumba Barat Daya. *UNION: Jurnal Ilmiah Pendidikan Matematika*. <https://doi.org/10.30738/union.v7i1.3984>
- BKAD Kecamatan Umalulu dan Amos Australia. 2019. Tenun Pahikung Mata Pelajaran Prakarya SMA Negeri 1 Rindi Umalulu. Kerjasama Komite Sekolah.
- Gerdes, P. (2004). Ethnomathematics as a New Research Field, Illustrated by Studies of Mathematical Ideas in African History. *New Trends in the History and Philosophy of Mathematics*, 11–36. [http://iascud.univalle.edu.co/libro/libro\\_pdf/Ethnomathematics as a new research.pdf](http://iascud.univalle.edu.co/libro/libro_pdf/Ethnomathematics%20as%20a%20new%20research.pdf)
- Ledi, F., Kusmanto, B., & Agustito, D. (2020). Identifikasi Etnomatematika pada Motif Kain Tenun Sumba Barat. *UNION: Jurnal Ilmiah Pendidikan Matematika*, 8(1), 87–95. <https://doi.org/10.30738/union.v8i1.5338>
- Purnama, R., Utami, C., & Prihatiningtyas, N. C. (2020). Eksplorasi Etnomatematika DEksplorasi Etnomatematika dalam Motif Tenun Kain Lunggi Sambas Kalimantan Barat dan Implikasinya terhadap Pembelajaran Matematika dalam Motif Tenun kain Lunggi Sambas kalimantan Barat Dan Implikasinya Terhadap Pembelajaran. *Variabel*, 3(1), 36. <https://doi.org/10.26737/var.v3i1.1307>
- Setiawan, W., & Listiana, Y. (2021). Eksplorasi Etnomatematika pada Batik Madura. *Jurnal Pendidikan Matematika (JPM)*, 7(1), 62. <https://doi.org/10.33474/jpm.v7i1.4985>
- Sugiyono. (2019). METODE PENELITIAN PENDIDIKAN. In *Bandung:Alfabeta*.