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ETHNOMATHEMATICS: MATHEMATICAL MEANINGS AND CONCEPTS CONTAINED IN BANTEN BATIK PATTERNS

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Abstract
Ethnomathematics utilizes numerical ideas in a culture that individuals in everyday life use. Indonesia is a country rich in ethnic and social practices. Batik Banten is one of the Indonesian nation's colonial heritage, which originates from Banten. Batik Banten has 75 typical Banten decorations applied to 54 batik patterns. This research was conducted to determine the meaning of Banten batik patterns or motifs and understand the numerical ideas in Banten batiks motifs. This research includes personal exploration with ethnographic methodology because what is being researched is about culture. The results showed that the Banten batik motifs, in addition to having a philosophical meaning in each pattern/motif, the motifs in Banten batik also contain numerical ideas or mathematical concepts such as geometric transformations, spatial structures, and so on.
Keyword: Ethnomathematics, Mathematical, concepts, Batik Banten

INTRODUCTION

Mathematics is a part of science that plays a vital role in everyday life. Mathematics plays a crucial role in ordinary daily life, but mathematics also plays a crucial role in schooling, especially in developing various % of other sciences.

Mathematics is not only in learning in school, but mathematics is often encountered in our daily lives to feel familiar with the existence of mathematics. It's just that the majority of us don't know this. Daily activities that are carried out consistently are what eventually form a habit or tradition. The relationship between the general public's way of life (culture) and the learning of numerical ideas (mathematics) is known as ethnomathematics.

The meaning of ethnomathematics itself was first expressed by D'Amrosio (1984) (Mahuda, 2020); specifically, "Ethnomathematics is how cultural groups are typical of mathematics (counting, measuring, connecting, sorting, and guessing)." According to him, ethnomathematics consists of two words, namely ethno and science; this ethno word implies any peculiarity that can frame social characters such as language, terms, beliefs, values, clothing, food, tendencies, customs, behavior, and many others. As for *mathematics*, he extensively explains numerical ideas or mathematical concepts. Thus, ethnomathematics is a culture that applies mathematical concepts in that culture that has developed in society, such as language, terms, beliefs, values, clothing, food, tendencies, customs, and behavior.

Batik is Indonesia's social heritage that the world has felt since UNESCO established it on October 2, 2009. Since then, every October 2nd has been celebrated as Public Batik Day as a form of pride in Indonesia's social heritage and affection for the nearest culture. Batik in Indonesia has quite a lot of types and motifs, including Batik Solo / Pekalongan, Batik Yogya, Batik Lebak, Batik Banten,

etc. Batik from each region has its contrast and quality, for example, Banten batik. The uniqueness of Banten batik motifs that make it unique compared to other batik is in its batik motifs that utilize important examples of improvements obtained from old historical objects that are usually called antique or twisted. Recognition from Indonesia's largest scientific freedom organization on May 25, 2004. Furthermore, the second quality of Banten Batik is that the shade used in general will be a subtle dim that shows the personality of the People of Banten and their way of thinking. The name and motif of Banten batik have always been identified with the history of Banten.

Research on exploration in ethnomathematics must have been done by many scientists before. For example: "Ethnomatematic research of Lebak batik motifs is reviewed from philosophical values and mathematical concepts" by Isnaini Mahuda (2020), and "Ethnomatematic research of Krakatau Cilegon as a high school learning asset by Anisa Amalia (2021)". His research stated that various batik patterns/motifs used as research objects contain numerical ideas or mathematical concepts such as geometric concepts, transformations, etc.

METHOD

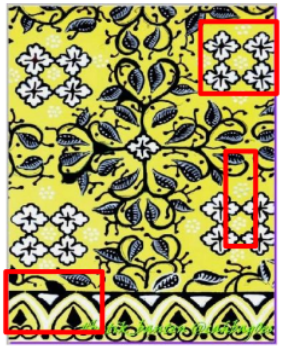
This research method uses qualitative using the ethnographic methodology. According to (Arikunto, 2006), qualitative research states that exploration is research that tries to describe information with words or sentences isolated with classification to obtain a purpose. The ethnographic methodology is a research method presented as a fact in life that expects to get an in-depth picture of the philosophical meaning and numerical ideas or mathematical concepts of Banten batik based on observations made by researchers. On the field. In this review, ethnographic methodologies describe, clarify, and dissect the philosophical qualities and numerical ideas of Banten batik motifs.

RESULTS AND DISCUSSIONS

This research produced an outline of philosophical meanings and numerical ideas or mathematical concepts that exist in the patterns or motifs of Banten Batik. The following explains the philosophical sense and numerical statements contained in Banten batik motifs that result from studies conducted by researchers.

1. Motifs/ Datulaya Patterns

Figure 1. Batik Banten Motif Datulaya



This motif is named "Datulaya," consisting of two words (Datu = Sovereign, Laya = residence). Datulaya motif is the name of the ruler's house of Sultan Maulana Hasanuddin / family room format in the Sultanate of Banten. Datulaya motifs are formed from several ornamental varieties derived from the National archaeological reconstruction artifacts. This is one of the characteristics or differentiators between Banten and another batik. The motifs come from ancient objects or artifacts arranged to produce batik motifs.

If you observe in figure 1, batik motifs composed of ancient or twisted objects contain mathematical concepts in the form of translational ideas (shifts), partnership, and reflection (mirroring) shown in datulaya motifs or patterns.

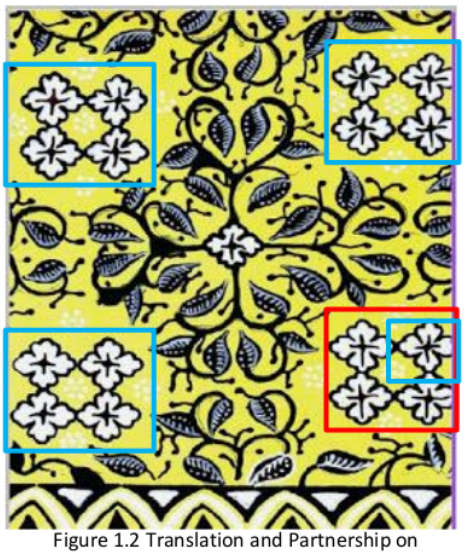


Figure 1.2 Translation and Partnership on Datulaya Motifs

Figure 1.3 Translation

Figure 1.4 Translation

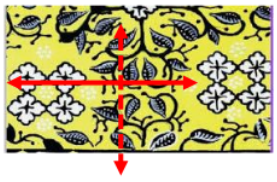


Figure 1. 5 Reflections on Datulaya's

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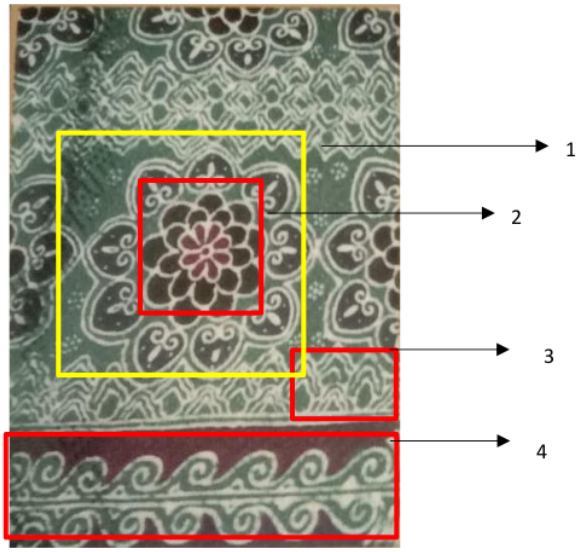
2. Surasaji Motifs/Patterns

Figures 2.1 Motif Surasaji Batik Banten



The surasaji motif means that it is the glory of the Banten sultanate government until the Sultan gets a valiant or formidable title. The mathematical ideas in surasaji motifs are translation, reflection or mirroring, rotation, and dilation.

Tanda arrow number 1 is included in the concept of rotation (rotation), the 2nd arrow is the concept of dilation, the 3rd arrow is included in the idea of dilation, and the 4th arrow is included in the concept of reflection. In contrast, the combination of arrow number 1 and number 2 contains the concept of translation (shift).

3. Motifs/Patterns of Srimanganti

Figures 3.1 Motif Srimanganti Batik Banten

Srimanganti motif has been recorded in the Historical Narrative of Banten (SB), an ordinary room in a building used as a seat for visitors to the rulers and rulers of Banten; this structure relies on stone and coral materials located at the door. North Kraton Suroswoan, the name of this batik, is taken from

the room in the royal residence. Srimanganti means Sri, which means 'ruler,' while Manganti means pause or pause. It can be said that 'Srimanganti' can be interpreted as a roofed door directly associated with the royal residence.

For example, we can see the motif of Batik Srimanganti, which is a double-toothed tumble and circles with a transverse distance of most of the circle's width. This motif is square or rectangular; then, the corners are filled with a half-link pattern Iran yes Ng beris Keep fish and Book patterned base triangle leaves And Yan color G flapped ai mirrored a dark, orange brick.

Ga mbar 3.2. Circle

Figure 3.2 Translation

4. Paseban Motifs/Patterns

Motif Pastebin

Figure 4.1 Reflection

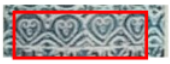


Figure 4.2 Translation

This is named "Paseban," which has the meaning of the name layout of the Banten sultanate's workspace or commonly called with a place facing sultan.

a. The mathematical concept that exists in this motif is the concept of reflection (mirroring).

Ga mbar 4.1 Reflection on Paseban motif

(split ketupat)

b. The second mathematical concept in this motif is the concept of translation (shift).

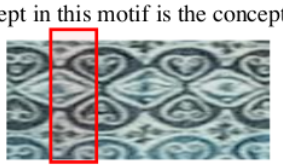


Figure 4.2 Translation of Paseban motifs

CONCLUSIONS

The results showed that each batik from an area has its characteristics. Banten batik has a meaning in every batik pattern or motif that certainly has mathematical elements. Ethnomathematics in Banten batik patterns / motifs include geometry including partnership (similarity), flat wake geometry, geometric transformation (which includes: translation / shift, reflection / mirroring, rotation / rotation and dilation).

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