

## Gurruṭu - Yolṅu Kinship Mathematics

The Yolṅu kinship system or **gurruṭu**, is exceedingly complex and presents an overwhelming challenge to Balanda who try to come to terms with it. When one appreciates what is involved in such knowledge one realises that it could not be otherwise.

Yolṅu kinship terms and concepts are not restricted to people. Using kinship terminology, a well educated middle aged Yolṅu can define his/her relationships with the thirty or so clan groups of NE Arnhemland, with their individual members, and with these clans' totems (including hundreds of plant and animal species, celestial bodies and landmarks), languages and countries. He or she can deduce and define relationships with every other NE Arnhemlander and with those from neighbouring areas (including such places as Groote, Maningrida, and Ngukurr).

There is a system of interlocking sets of kinship terminology to specify relationships. Some of these sets will be described and elaborated below. The ability of Yolṅu to define the elements in their surroundings (which Westerners might label in categories of human, animal, plant, land, sky, water, spiritual) in kinship terms is crucial because they define the relationships and delineate appropriate behaviour (and inappropriate behaviour) between these elements. These relationships, so defined, provide part of the web which unites these elements into one corporate body.

The kinship structure and the various interrelationships which are organised within it provide the foundation for Yolṅu society and culture. The very pattern of Yolṅu family and community life ensures that all Yolṅu learn the essentials and details of their kinship structure and how

to operate within it. For example, a principal feature of Yolŋu social intercourse is frequent acknowledgement of and reference to each other's kinship status.

It is at the level of structure that I aim to provide a description and a Western mathematical analysis of Yolŋu kinship patterns. As an ordered system at the heart of Yolŋu culture, **gurrutu** provides the framework around which the Yolŋu world at all levels is organised, and as such is Yolŋu mathematics (under the terms of the broad definition of mathematics given earlier). The nature of the system as a whole (i.e. the nature of the Yolŋu schema or system of metaphors) is enunciated in **manikay** (ceremonial song cycles), and is symbolised in Yolŋu art. Masters at this level of understanding are usually the ceremonial and clan leaders.

My approach in revealing order in the structure of the kinship system is to try to isolate it through the construction of models presented as schematic diagrams. This is the approach I took over the years in trying to understand it for myself, with my diagrams growing more detailed and more complex. The limitations of this decontextualisation must be recognised. For me this recognition arose out of incidents such as when I heard a woman scream out that some children were killing her grandmother (**märi**). I looked around and saw some children throwing stones into a trench, but it was a blue-tongued lizard being stoned to death and not an old lady. My kinship diagrams had not provided for clan totems. The diagrams also do not account for the fact that the **Djaŋ'kawu** Sisters (of Dreamtime fame) belong to the **Bilinydjan** subsection (**mälk**) and spawned a number of clans in their journey from the east, and who are variably related to the membership of different Yolŋu clans, and moreover changed clan identity several times themselves in their creation journey.

The point then, is that examining the Yolŋu kinship system in terms of mathematical patterns is a Westerner's way of trying to make sense of the Yolŋu world. It is interesting, it is useful in describing the order within those aspects of the system's structure which bear such an analysis, but it cannot (as I have indicated above) paint the whole.

While these limitations are recognised, a close look at the structure of the system can perform some very useful functions:

1. It can reveal to Balanda a depth in Yolŋu conceptual sophistication of a mathematical nature in terms which a Western mind can appreciate, and can provide a glimpse (albeit expressed in Western terms) of the Yolŋu schema or system of order, within which their world is constructed.

2. It affords non-Yolŋu with a means for learning about aspects of the Yolŋu kinship system.
3. It provides an opportunity for Yolŋu to gain with the assistance of a familiar context, an insight into the nature of Western mathematical thinking.

It should be pointed out that Balanda investigation of the Yolŋu kinship system is far from new. In his book *A Black Civilisation*, first published in 1937, W. Lloyd Warner describes the Yolŋu cultural world (including the kinship system) in detail and at depth as he saw it in 1927-28. His analysis reveals a level of understanding which for a Westerner is remarkable, and in my assessment unsurpassed (though his publication of sacred and private Yolŋu knowledge would in today's context be seen as unethical). The analysis of the kinship structure which follows in this paper though, is mathematical in nature. Whilst the patterns themselves are quite elegant once they are revealed, the matter of isolating them is difficult and complex. I have presented in some detail the path I have taken in developing and applying the models which are used to demonstrate the patterns (being otherwise hidden), in order that the critical and knowledgeable reader can adequately assess the validity of these emergent patterns and the appropriateness of the models as descriptors of the reality from which they are derived. (The reader who finds the mental gymnastics required in following the analysis heavy going, is advised to skim through pages 21-36, focussing on the patterns set out in figures 1-10. This would be sufficient to follow the discussion (Implications for Educators) beginning on page 37.)

The analysis proceeds by the construction of a kinship model generated by a number of basic Yolŋu laws which pertain to moiety, selection of marriage partners, patrilineal **bäpurru** (clan) determination, and matrilineal **mälk** (subsection) determination. The model develops into a series of diagrams based on progressive inclusion of a series of assumptions that Yolŋu choose ideal marriage partners according to moiety, relationship, clan and subsection. These laws and assumptions require exposition as follows:

## Moiety

The total Yolŋu world is divided into two. In English we refer to these as moieties. Yolŋu call one of these **Dhuwa** and the other **Yirritja**. This division separates people, **bäpurru** (clans), **dhäruk** (languages), **wäŋa** (country), ceremony, the living world (plants and animals), cosmos, and even points of the compass, into two broad and complementary groups. A **Dhuwa** person belongs to a **Dhuwa** clan, owns **Dhuwa** land, speaks a **Dhuwa** language and holds **Dhuwa** totems and so on. The same goes for a **Yirritja** person. These two moieties though are not independent

entitites. They are interdependent. With respect to marriage and children the following should be noted:

- A Yolŋu person must marry into the other moiety (a corollary is that a Yolŋu must marry into another clan).
- Children are the same moiety as their father and opposite to their mother.

## Marriage Laws

There is a complex array of criteria by which marriage partners are determined. For the moment the following are important:

1. A man ideally marries his mother's brother's (**ŋapipi's**) daughter whom he calls **galay**. Thus a man marries a member of his mother's clan. The relationship of a person to his mother's clan is denoted by reference to this clan as **ŋāndipulu** (mother's group).

2. A woman ideally marries her father's sister's son (whom she calls **dhuway**). Her children will, in following her husband, belong to his clan. A woman calls her children **waku** and she calls her children's clan **wakupulu**.

A hypothetical Yolŋu family tree can be generated by adding two assumptions to the assumption that each person takes their ideal partner (as defined above):

1. Each man marries one woman and each woman marries one man.
2. Each marriage produces two fertile children - one boy and one girl.

Figure (I) shows this hypothetical family tree. The family tree extends vertically to three generations above and below ego and extends laterally to include ego's **dhuway's dhuway's dhuway** on the father's side (to the left), and ego's **galay's galay's galay** on the mother's side (to the right). It provides the basis for the series of diagrams which employs the following conventional symbolism:

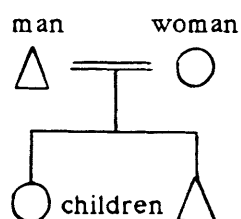


Figure 1. Yolngu Kinship Patterns - Rule generated model

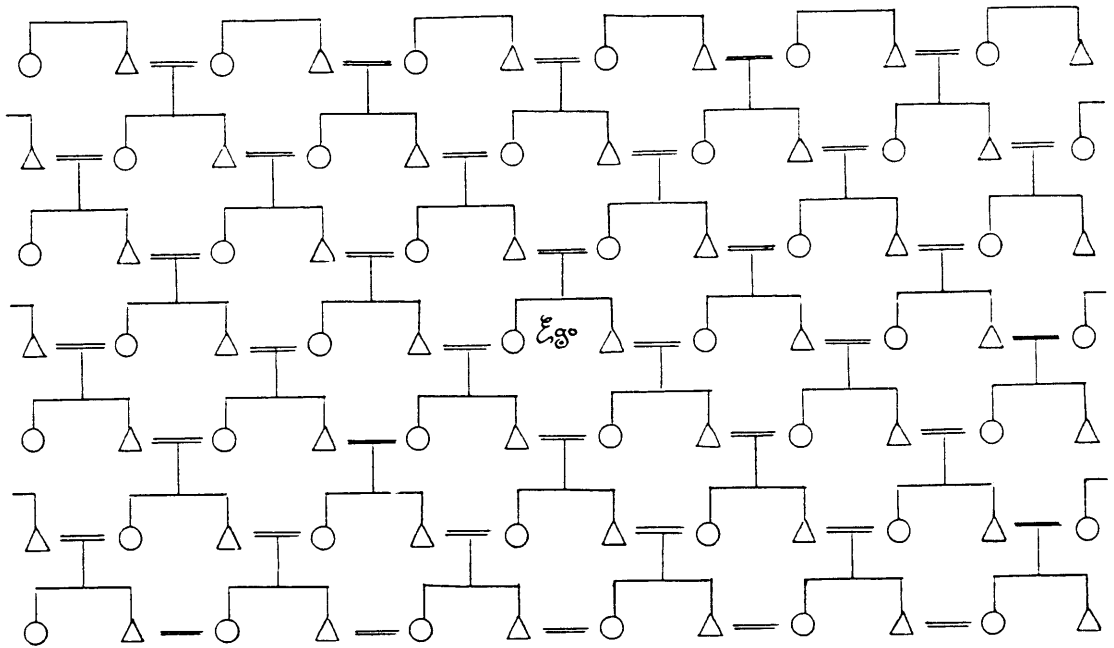
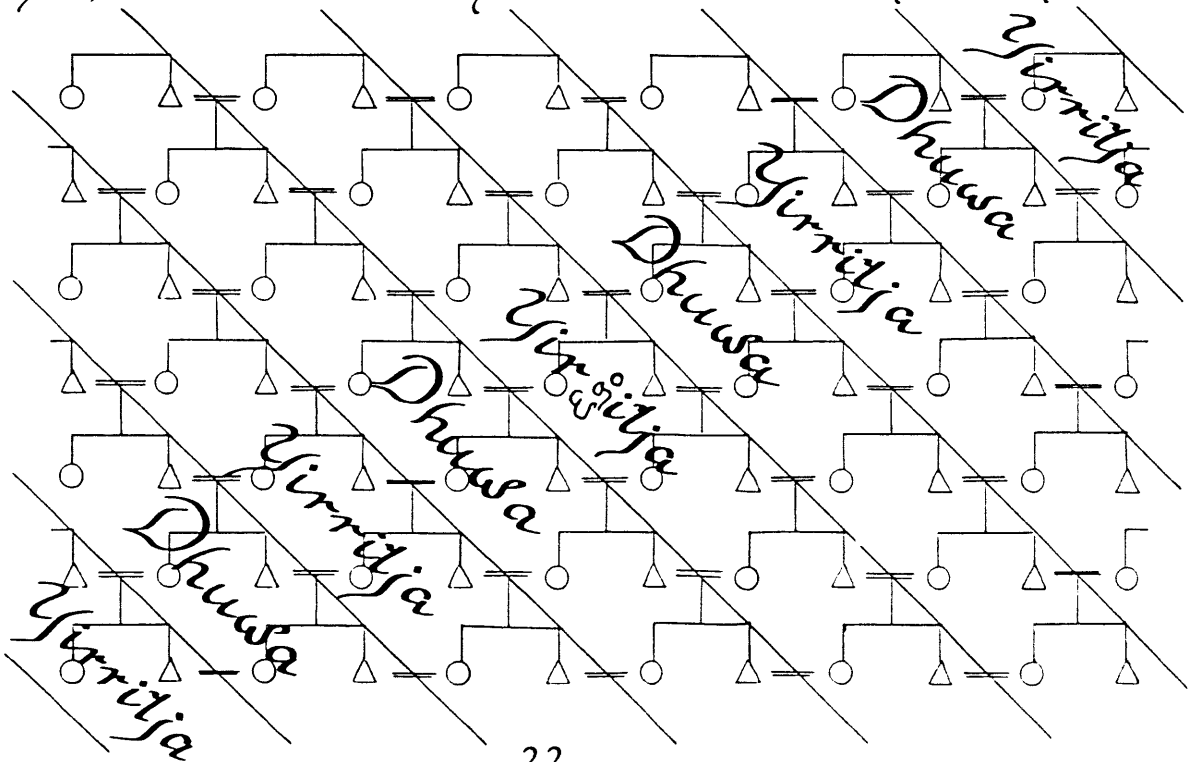


Figure (2) includes the added provision that each person marries into the other moiety and that the children belong to the moiety (and clan) of the father. In this way another level of complexity (and order) can be illustrated. For the sake of example, ego's moiety is given in figure (2), as **Yirritja**. (If ego were to be **Dhuwa**, then the **Dhuwa/Yirritja** labels on the diagram would simply be reversed).

Yolngu Kinship Patterns - figure 2. - Alternation of moiety



## Alternation of Moieties

Before adding further levels of complexity it may be appropriate to note the pattern of alternation which presents itself in figure (2), which has been sectioned by constructing a series of parallel lines at an angle of 45 degrees to the perpendicular axis. These lines follow the direction of the male lines of descent. In Yolŋu language this line of descent is termed **yarrata** (which also means simply line). The sections which are formed contain a series of brother/sister pairs (one pair in each generation). There are 12 such sections in this diagram. It can be seen that there is a regular alternation between **Dhuwa** and **Yirritja** moieties from one diagonal section to the next, where the brother/sister pairs of successive generations within each section belong to the one clan.

## Kinship Terminology

Yolŋu kinship terms consist of a series of reciprocal pairs based on the perspective of self (ego). In Yolŋu terms I call my father **bäpa** and I call my son **gäthu**, so that I relate to **bäpa** in the same way **gäthu** does to me. **Bäpa** and **gäthu** from ego's perspective, thus constitute a reciprocal pair. A Yolŋu looking at me and my son together would refer to the pair of us as **bäpa'manydji** (or alternatively **gäthu'manydji**) in recognition of the way I and my son stand together. The same term implying the same relationship is used if it is my father standing with me rather than my son, since this would be an equivalent (though inverse, or reciprocal) arrangement.

Transposing this concept into English terms, I could call my father and my son a reciprocal pair since from my perspective I relate to my father (I call him "Dad") in the same way that my son relates to me (he calls me "Dad"). This is distinguished from my father's perspective since he calls my son, "Grandson"; and from my son's perspective, who calls my father, "Grandfather".

There are fourteen of these pairs. With some of them there is a difference in relationship and terminology depending on the sex of one or other of the pairs. None of the terms have English equivalents although we still often translate them by selecting a term in English which overlaps with the range of meanings of the Yolŋu word. For example a female refers to her full blood brother as **wäwa** (or **yukuyuku** if he is younger than her). But she also calls her father's brother's son **wäwa** and her mother's sister's son **wäwa**. She calls her father's father's father's father **wäwa**, and her daughter's daughter's daughter's son **wäwa**. In addition she also calls men **wäwa** who are not so closely related but who are classificatory brothers. She might also call **wäwa**, strangers who are in the same subsection as she is. The other terms are

no less difficult to translate. Therefore they will not be, though the principal English equivalents can be deduced from figure (3). For example **galay** can be expressed at one level in English as mother's brother's child, and **dhuway** as father's sister's child.

In the following list of reciprocal pairs those terms which apply to only one sex are denoted (m) or (f) as the case may be. Also note that some of the terms have alternatives (which are not listed). For example one's father (**bäpa**) can be alternatively called **mori** (if father and child are **Yirritja**) or **mälu** (if **Dhuwa**).

### Yolŋu Reciprocal Pairs

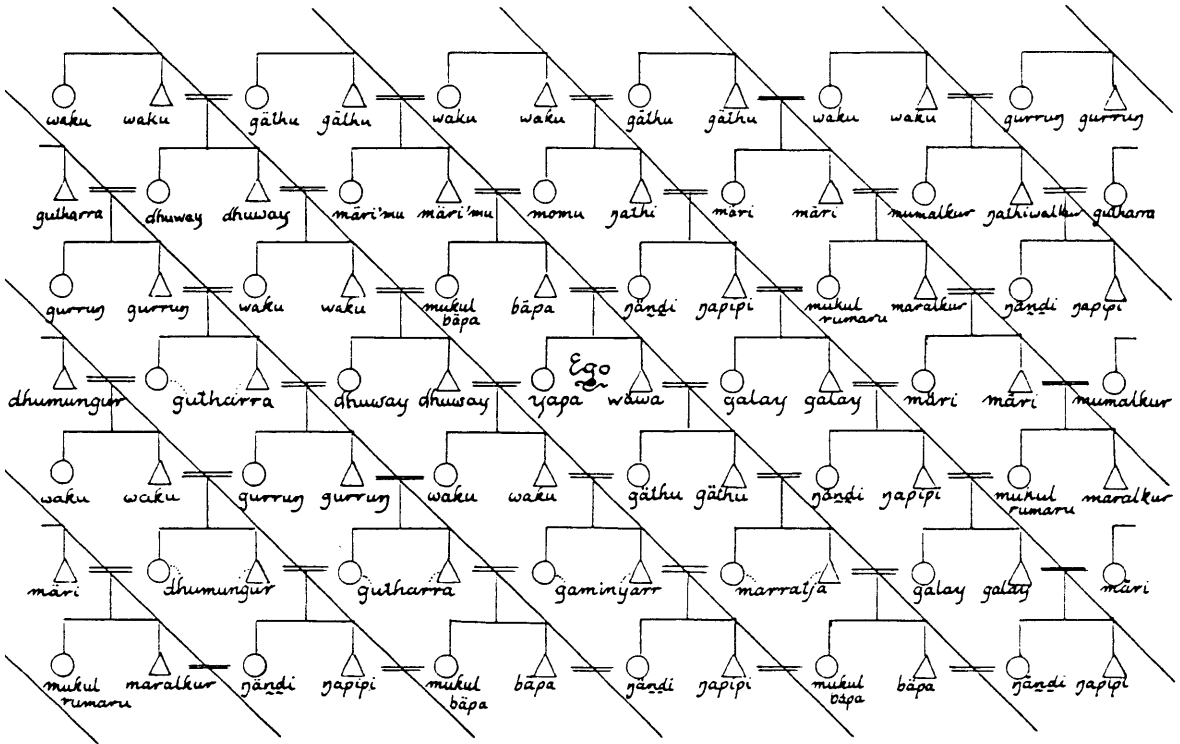
(f)	<b>yapa</b>	<b>wäwa</b> (m)
(f)	<b>ŋändi</b>	<b>waku</b>
(m)	<b>ŋapipi</b>	<b>waku</b>
	<b>märi</b>	<b>gutharra</b>
(m)	<b>ŋathi</b>	<b>gaminyarr</b>
(f)	<b>momu</b>	<b>gaminyarr</b>
	<b>märi'mu</b>	<b>marratja</b>
(m)	<b>bäpa</b>	<b>gäthu</b>
(f)	<b>mukul bäpa</b>	<b>gäthu</b>
(f)	<b>mukul rumaru</b>	<b>gurrurŋ</b>
(m)	<b>maralkur</b>	<b>gurrurŋ</b>
	<b>galay</b>	<b>dhuway</b>
(f)	<b>mumalkur</b>	<b>dhumungur</b>
(m)	<b>ŋathiwalkur</b>	<b>dhumungur</b>

These terms denote the nature of the relationship between the members of each pair, that is they allow the determination of the way each should behave towards the other. These behaviours can vary from total avoidance of direct contact and yet with deep respect (for male **gurrurŋ** and **mukul rumaru**), to joking, teasing relationships (for female **gurrurŋ** and **maralkur**).

These labels can be applied to the diagram according to the position of each person in relation to ego. It should be noted that almost all the terms appear more than once, and some of them several times. In determining the exact positions in relation to ego I have sometimes encountered confusion or disagreement as Yolŋu refer to the layout of their own particular families, which are not the result of a series of "ideal" marriages, or because they have no living or remembered individuals occupying some of the more distant positions. Not all adult Yolŋu appear to hold the generalised structure in their head as a theoretical construct. Those that do are very impressive to work with. I

remember checking the diagram with an older man for whom the diagram was no use because he did not read. In working out to the edges of the diagram I found myself asking questions equivalent to, "What relation to you is your paternal grandfather's brother-in-law's brother-in-law?" It was a question I could ask from a diagram, but he could answer it from his head.

Figure 3. Yolngu Kinship Patterns ~ Relationship terms & arrangement





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