1. African Sona and Mirror Curves

The Sona tradition was developed in eastern Angola and neighbouring areas of today’s Zambia and Congo/Zaire (GERDES, 1995). Illustrations in the sand accompanied story telling among the male Cokwe population. Sona are composed of lines embracing the dots of a reference frame of certain dimensions. Most Sona are monolinear (composed of one line) and symmetric (GERDES, 1999, 2006a) (Fig. 1).

A particular class of traditional Sona may be described as mirror-curves (GERDES, 2006b). The chased chicken’s path constitutes an example of a mirror-curve (Fig. 2). It may be considered as the smooth version of a polygonal line that is reflected in small double-sided mirrors that are placed—some horizontally, some vertically—in the middle between either two vertical, or two horizontal neighbouring dots of the reference frame. During the presentation an introduction to Sona geometry will be given, as well as an explanation of the generation and principal properties of mirror-curves.

2. From Mirror Curves to Lunda-Designs and Cycle Matrices

The concept of mirror-curves was discovered by me when I was analysing a particular
The traditional *lusona* representing the chased chicken’s path (left) and the chased chicken’s path as a mirror-curve (right).

![Fig. 2](image1.jpg)

Examples of a 2-colour Lunda-design and of a 3-colour design.

![Fig. 3](image2.jpg)

class of traditional *sona* drawings from Angola. Later I saw that several Tamil *kolam* drawings from India and Celtic knots may also be described as mirror-curves.

The mathematical study of mirror-curves led me to discover several new types of designs and matrices (GERDES, 2007): First of all, various types of *Lunda-designs* and Lunda-matrices (Fig. 3); Later on, I found a particular class of Lunda-designs, that I called *Liki-designs*, that led me to discover a type of interesting matrices, called cycle matrices. By changing some characteristics of cycle matrices, I was led to several types of *helix matrices* and *cylinder matrices*. During the presentation I will present examples of *sona* and kolam that may be considered mirror-curves, and I will explain the relationships between mirror-curves, Lunda-designs and the various new types of matrices.
REFERENCES

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pp. (internationally available in print and as download from lulu.com by going to “paulus gerdes”, or at http:/
/stores.lulu.com/pgerdes (preview available)).