

## DEFORMATION NETS FOR THE REFLECTIVE CYLINDRICAL ANAMORPHS

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**Abstract.** The aim of this paper is to present the method of creation of a deformation net that will be reflected in a cylindrical surface, either in a convex or a concave cylindrical mirror. Deformation nets consist of two sets of lines: one set of straight lines and the other set consists of the segments of conchoids.

**Keywords:** reflective anamorphic images (=mirror anamorphs), cylindrical anamorphs

### 1 Introduction

This publication is a continuation of a discussion on anamorphic images of objects presented in previous papers [3]. The author's attention has been focused on the reflective cylindrical anamorphs. According to the classification presented in [1], this type of anamorphs can either be called as "mirror" or "reflective" anamorphs because their restitution requires not only setting a proper observation point (=view-point) but also properly defined and positioned mirror that reflects the image. Again, so called deformation nets will be constructed depending on the type of mirroring surface. In particular, this research work aims at developing deformation nets for the cylindrical mirrors.

### 2 Mapping of verticals of the orthogonal deformation net for a reflective convex cylindrical anamorph

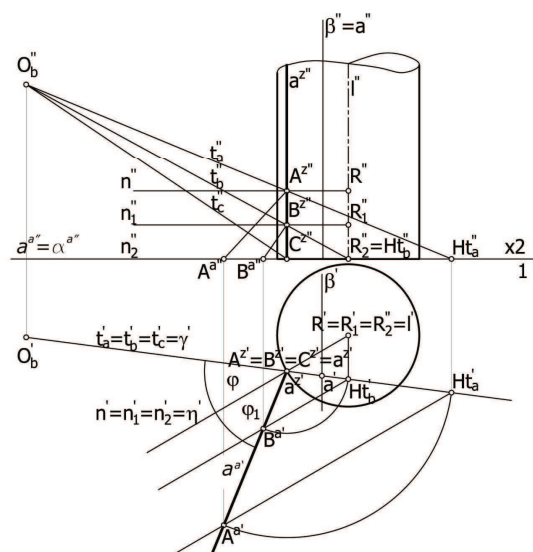


Figure 1: Principle for anamorphic mapping of verticals



Central projection of the ellipse from the view-point  $O_b$  will produce a segment  $D^a L^a$ , which will be double counted. Anamorphic image of this segment will determine a counter-image for the ellipse. The image of this ellipse constitutes a curve of the fourth order with a singular loop. The resulting curve belongs to the family of limaçons, which is also called a family of conchoids.

#### 4 Construction of a deformation net for a reflective convex cylindrical anamorph

In the zone of restitution an orthogonal net of horizontals and verticals has been placed. The verticals are parallel to the cylinder generators and after transformation they will remain the straight lines. The segments of the horizontals will get transformed into the segments of curves of the limaçon of Pascal family, which has been proved in [2]. The limaçons together with the images of verticals create an anamorphic deformation net for the convex cylindrical reflective anamorph (Fig. 3).

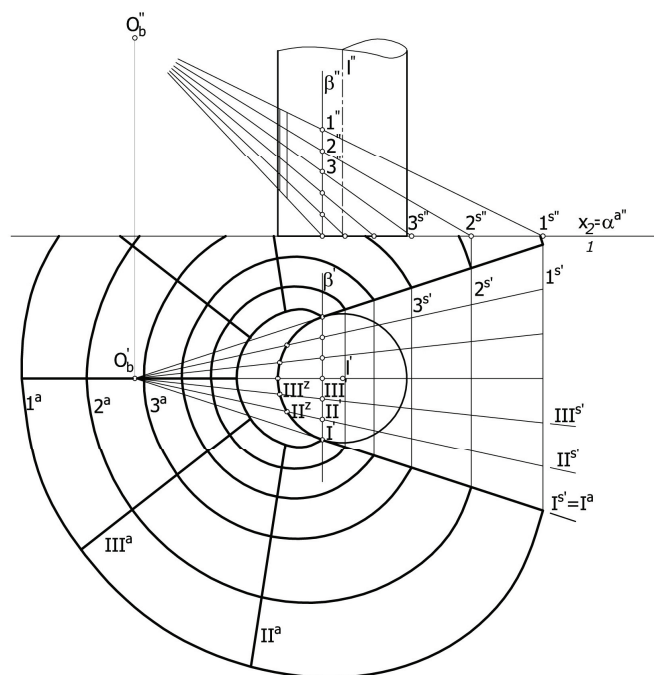


Figure 3: Graphical representation of a deformation net for a reflective convex cylindrical anamorph

#### 5 Construction of a deformation net for a reflective concave cylindrical anamorph

Figure 4 shows a deformation net for a reflective concave cylindrical anamorph. Geometrical principle for its construction is based on the described in earlier paragraphs constructions. Horizontal segments 1, 2, 3...of the net, which are projected centrally onto the anamorphic plane through the cylinder's surface, show up in the anamorphic plane as the corresponding lines  $1^s$ ,  $2^s$ ,  $3^s$ . Anamorphic images of the lines  $1^s$ ,  $2^s$ ,  $3^s$  will constitute the “internal” segments of respective limaçons of Pascal. It is necessary to note on the inverted order of lines when you construct a deformation net.

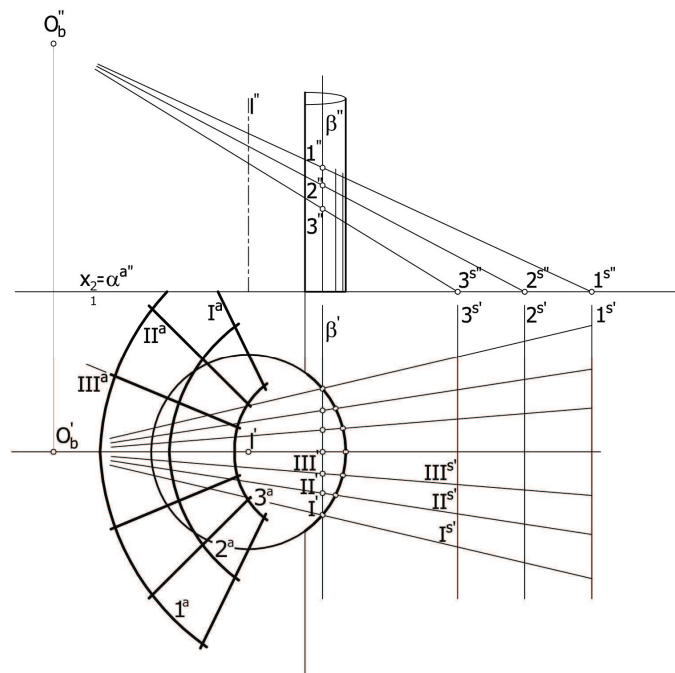


Figure 4: Graphical representation of a deformation net for a reflective concave cylindrical anamorph

## 6 Conclusions

This publication is a continuation of a discussion on anamorphic images of objects presented in previous. In particular, the construction of deformation nets for reflective cylindrical anamorphs, both convex and concave, has been discussed.

In subsequent publications the author will continue with the discussion on construction of the other deformation nets, which were described and classified in [1].

## References

- [1] Zdziarski A.: *Classification and Nomenclature of Anamorphic Images*. The Journal of Polish Society for Geometry and Engineering Graphics, Volume 15 (2005), 26-29.
- [2] Zdziarski A. Pałka A: *Limaçon of Pascal as an Anamorphic Image of a Circle*, The Journal of Polish Society for Geometry and Engineering Graphics, Volume 22(2011), 3-6.
- [3] References used in paper [2]

## SIATKI DEFORMACYJNE DLA ANAMORFOZ REFLEKSYJNYCH WALCOWYCH

Zasada konstruowania siatek anamorficznych jest tematem serii artykułów przedstawianych przez autora w poprzednich Biuletynach PTGiGI. Niniejsze opracowanie dotyczy w szczególności grupy anamorfoz refleksyjnych – powierzchniowych, dla których restytucja obrazów anamorficznych tym razem dotyczy ich odbicia w zwierciadłach walcowych, zarówno wklęsłych jak i wypukłych, i oglądanych z określonego punktu obserwacji. Dla tych refleksyjnych anamorfoz walcowych rozważa się, podobnie jak w poprzednich publikacjach, deformację siatek ortogonalnych.