European Society for Mathematics and the Arts

Newsletter

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Dear Colleagues,

ESMA is involved in the social use of artistic works characterized by their mathematical background.

The visualization of mathematical objects is a preliminary step in the creation of such artistic works. Category theory from algebra, or functional spaces from analysis are in some sense too much abstract to be visualized. On the contrary, geometrical and topological objects are the best candidates. Mathematicians involved in the theories of these objects, benefiting from resources in computing and software, were the main developers of visualization. The American and German schools remain leaders in that field. They have produced many beautiful visualizations of single mathematical objects. A characteristic of these works is their absolute conformity with the mathematical data and the fact that they are completely independent of any personal affective and social thought.

Some artistic works show a more personal involvement in their conception. They are characterized by a richer and original composition, the presence of several simultaneous objects and deformations.

All of these works can be of some use for a true popularization of mathematics. Mathematicians have felt the need to try to popularize the content of their science for selfish or generous reasons. The development of that science relies in large part on the use of rational and analytic tools, so that most mathematicians are remarkable technicians involved in the use of these tools, but which have so much imprinted their mind that they have partially inhibited the sensitivity to other forms of deeper working of the mind. The typical way of presenting mathematics is the formal one that appears in Euclid books[1].

1. In his review of an excellent book on old Indian mathematics (AMS Notices (March 2010)), David Mumford writes : «Rigorous mathematics in the Greek style should not be the only way to gain mathematical knowledge. In India , ... The recent episodes with deep mathematics flowing from quantum field and string theory teach us the same lesson : that the muse of mathematics can be wooed in many different ways and her secrets teased out from her.»

This way of presentation has a tendency to rub out the internal and subtle affectively inside communication between animal species, and mankind in particular.

What could be intended by popularizing mathematics ? Show and familiarize any people with mathematical objects, then by looking at them exhibit and point out a few important concepts and properties related to the physical world, give a few historical comments, give a first and easy explanation of some significant properties.

Given these views and scopes, very few has been made to popularize mathematics. Almost all that has been undertaken concern children, the public of schools. Adults, parents whose influence on the childrens mind is obvious, are ignored. Some annual festivities are organized in some places which gather young people under the guidance of their teachers : they mostly play games, construct a few objects. But there is a large gap between mathematics and games, and the mathematics behind the constructions are really too much developed to be able to be used with kids. They learn nothing. In that way, these festivities do not reach the scope of really popularizing maths.

Exhibitions, whose value is increased by convenient exposés, have a different impact. This impact is not first rational, it is a sensitive and affective impact, going into the subliminal and deeper areas of the mind. Exhibitions leave spontaneous and permanent tracks. The unusual shapes of the objects attract the attention, the shimmer of their colours contribute to fix their presence into the memory. People's mind is now prepared to listen some words related to the content of what they are looking at with curiosity.

Exposés have to be given in the presence of the works which will be used as the physical background on which specific concepts and properties are materialized. Pleasantly sitting in comfortable seats, not being surrounded by four plain walls but by an usual, rich and coloured environment, the public is quite receptive to a different discourse as the scholar one. One role of the speaker is to guide the eye of the spectator on specific features of the works by comments adapted to the knowledge and the maturity of the audience, to give rise to various reactions from the public, to direct and to exploit them.

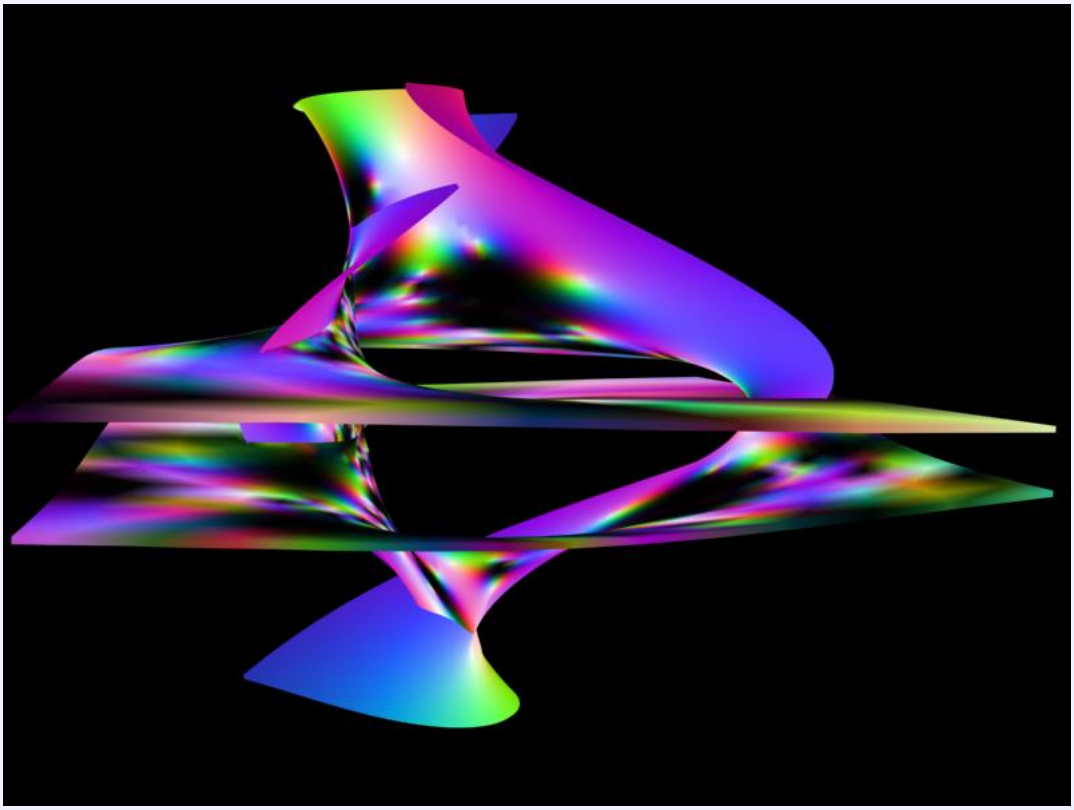
A new heading in Documents, «Popularization and Pedagogy», will refer to attempts and experiments in popularizing mathematics through various artistic means, including for instance dance and theatre. Contributions to the content of this heading will be gratefully received. From Capmath, a French institution devoted to the promotion of mathematics, we got a small fund for the preparation of a catalogue on paper of the content of our exhibitions. The reference of that catalogue will be included in the heading.

Exhibitions are costly. ESMA has been generously helped for some of them. No help for a few others which are mainly funded by dues (cf Adhesion on the website)...

We are entering summer time. The next Newsletter will appear in early September. I wish you nice sunny days.

Claude

P.S. Here is a new image sent by Mikael Mayer



with the following comment : «The process of extraction of the complex function on an interval $[-4-4i; 4+4i]$ is simply in the form $(x, real(f(x+iy)), imag(f(x+iy)))$ and the colouring is obtained with the Reflex process on an other function $u(x+iy)$which is the same as tracing the function $u(f^{-}1(z))$.»

Cf also the following article : Wegert E.-Semmler G. itPhase Plots of Complex Functions : A journey in Illustration, Notices of the A.M.S., 58 (6) 2011, 768-780.

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