Mathematical Images in Art and Communication (Extended Abstract)

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Abstract

In our talk, we will discuss the topic of mathematical images in the context of art and mathematics communication. We will give a brief overview on the history of mathematical images with a focus on digitally produced images, for example the Mandelbrot set. Then, we will discuss the following areas and questions:

1   Formats and Forms of Presentation

How can images be produced? (different printing technologies, from photo print to acrylic and textile prints). What picture sizes are recommended, what are standard image formats? (vector vs. pixel based, compression, resolution, common errors and problems). How can pictures be presented? (standard gallery presentation, innovative presentations, digital, big-size, outdoor, etc.). What are common contexts of mathematical picture presentations? (offline/online media, exhibitions, galleries, schools). How can pictures be distributed? (digital, shipping, open licenses)
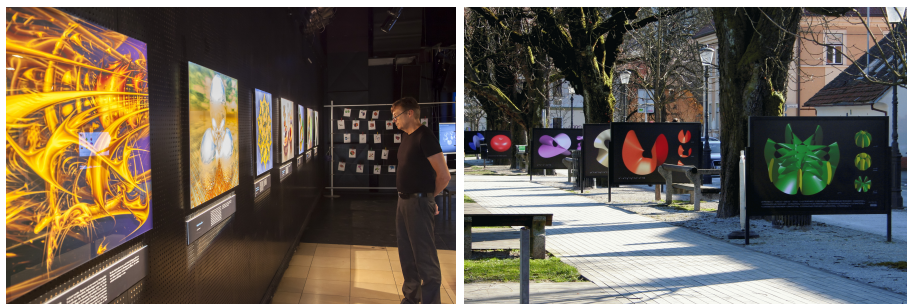

Figure 1: image credit: HLFF (left), Mateja Budin (right)

2   Moving Images - Videos and Animations

What are advantages of (short) movies compared to still images (changes over time, change of perspective, sound, story, more impact)? What are disadvantages (screen or projection needed, audience is not as free, needs to follow in pace and direction of thoughts)? Different techniques (stop motion, computer animation, live demonstration, white board animation, lecture…combinations possible). Examples. Growing interest, festivals and competitions, video platforms, integration in social media, mobile devices for recording and to watch.

3   Mathematical Topics and Classification

Are there common topics and trends? (fractals 2d/3d, non orientable surfaces, algebraic surfaces, differential geometry, polyhedra, knots, etc.). How can we classify pictures? (by topic or technique for example raytracing, triangulation, manual creation, etc.)

Figure 2: image credit: Luc Benard, Richard Palais (left), Bianca Violet (right)

4   Impact and Evaluation

What is a "good" mathematical picture? (mahemaical content visibility, aesthetics, impact for non-mathematicians, art component) How can mathematical knowledge be transferred through pictures (create curiosity, add equations, add explanation texts, add guided tour or tutor explanations, etc.). How can we evelute the impact of mathematical pictures? (present our planned survey)

5   Examples and Project Showcase

What are the common mathematical picture databases (Bridges, AMS, IMAGINARY, local artist portals)? Where are pictures shown? (maths museums, maths exhibitions, concrete examples). Presentation of many mounting techniques (from more than more than 150 IMAGINARY exhibitions in train stations, art galleries, public squares, banks, etc.), new forms of picture presentations (user generated exhibitions, tools for users/visitors to re-create the pictures).

6 References

http://www.imaginary.org/galleries
http://www.imaginary.org/events
http://www.bilder-der-mathematik.de/
http://www.ams.org/mathimagery/
http://gallery.bridgesmathart.org/
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et al.