Sublime in MATHS

Antoine Poulin

Mathematics and its explanatory power is very useful for finding patterns in natural phenomenons and, to a certain extent, some quantitative social ones. While art and mathematics have been connected throughout history, for example through the study of perspective or the work of M.C. Escher, it is unclear how this collaboration is present in modern times. Through this project, which was executed in collaboration with Ève-Marie Marceau, we try to use mathematics as metaphor to find and give characteristics of the sublime. The parallel between models and metaphors is explored and a few mathematical metaphors are used to describe the sublime. Here, we look at one metaphor: singularities of functions said to be holomorphic. These function satisfy certain natural conditions which makes their study fundamental to mathematics.

Why MATHEMATICS?

As a mathematician, I find that mathematics has incredible power for metaphors and transcendental imagery. The beauty in mathematics partly resides in understand very specific facts about the objects at play; much of the behavior is left unknown, to your own imagination. In this act of imagination lay intuitions, doubts, disagreements, conjectures, and everything which fans my interest in mathematics.

What is Sublime?

The sublime is a feeling undefinable through words. It is an experience outside of symbolic knowledge. Multiple theories of the sublime have peaked through over the years, but there is no concensus. Edmund Burke writes "Whatever is fitted in any sort to excite the ideas of pain, and danger, [...]or operates in a manner analogous to terror, is a source of the sublime.".

COMPLEX ANALYSIS

When looking at numbers, there are multiple systems one can consider. The integers, fractions, the number line are all different system to represent numbers. A lesser known number system is the complex plane, which also considers the IMAGINARY numbers, including the square root of -1. Functions on the real line can have a number of niceness properties. In the case of the complex plane, a natural property is being HOLOMORPHIC. When a function is holomorphic, there a few "breaking points" it can have, similar to how the function y = 1 / x is not defined at x = 0. We call such points singularities. Some singularities are well behave, which we call poles. Other, however, are called *essential*. A fundamental property of such singularities is their chaotic surrounding:
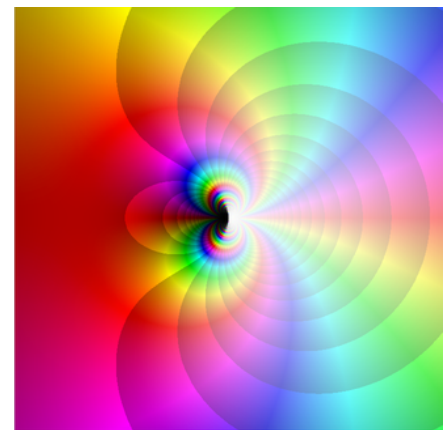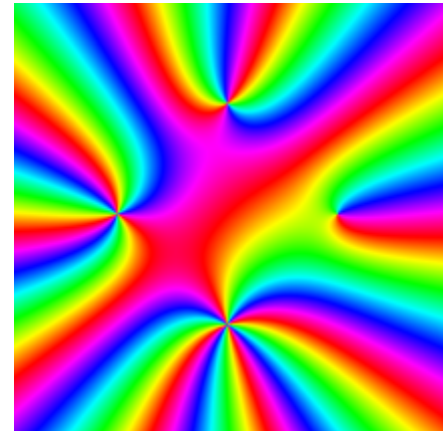

Figure 1: i) On top, pole singularities. ii) On the bottom, an *essential* singularity.

BIG PICARD THEOREM

Any HOLOMORPHIC function f(x) assumes any complex value, with the possible exception of one, in the neighbourhood around an isolated *essential* singularity

What about the *Sublime?*

The sublime behaves like an *essential* singularity in the following sense: when someone approaches the sublime, what happens is akin to approaching an *essential* singularity. There is no way to describe what they feel, like approaching an *essential* singularity with a mathematical sequence of numbers. The path you take to approach the sublime makes the experience unique and unreproducible, even if reading the same poem twice, for example.

My *Sublime* journey at B21

My journey at B21 was interesting and eventful. I learned about B21 through my friends, Elissa Kayal and Ève-Marie Marceau, when I helped them with the "Collectif de Poésie Francophone de McGill". Later, Ève-Marie proposed to me a project at B21, to work in modelling the *Sublime* in Poetry using mathematical concepts.

Through the Fall, we tried looking at what this meant, tried to find mathematical tools to define what interpretation was and how metaphors could work. We officially started the project in the spring. I found a community of interesting and interested people with whom meaningful and fun discussions were always waiting to happen.

My project with Ève-Marie evolved with time, each of us looking at our own things, but always come back to share and discuss about out findings on the *Sublime* . My project was more **MATHEMATICAL** , and I absolutely loved exploring the theories I love in the B21 setting, in ways that I could never have done in a more standard academic project.

My personal journey at B21 was full of emotion. Starting my PhD, I feel like I'm lost in the math. I was unsure on how to pick a project I like, how to ensure I work in mathematics I find beautiful and that motivates me.

Over my project at B21, I had time to reflect on mathematical proofs and what I find *Sublime* about them. I managed to explore back theories I had not worked with and unorthodox ways to think about mathematics. It profoundly helped me find a direction for the future years.

Thanks to everyone at B21 for the amazing semester and great discussions. Thanks to Ève-Marie for bringing me into this wonderful community.
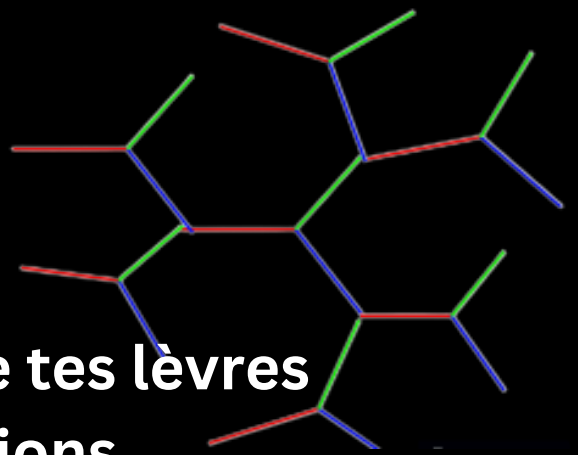
L'encre séchée autour de tes lèvres
trahit tes désirs, tes pulsions.
Quand as-tu goûté le miel
pour la dernière fois?
Quand as-tu laissé tes doigts
s'enfoncer dans la chair d'un piano?
Les ongles longs, le souffle court, le
regard absent.
Quand t'es tu laissé fondre dans les
sables mouvants?

Scan me for an
accompanying
video!