MANIM IN PHYSICS TEACHING

UWE ZIMMERMANN
Uppsala University, Sweden
E-mail: uwe.zimmermann@angstrom.uu.se

MANIM, from Mathematics and Animations, is a Python library which was created by the well-known Youtube profile Grant Sanderson, aka 3Blue1Brown. Grant has a background as educator in the established Khan Academy. His introductory videos to basic and advanced mathematical and scientific videos cover a wide range from algebra to quantum computing. In order to present the concepts in his videos he created a library of helper functions which spread to other educators during the time of increased online teaching in the corona pandemic. Since the library was primarily programmed by Grant for his own use, he deemed it to be almost unusable by everyone else before a group of enthusiasts formed and started to develop a "community edition" branch, eradicating many bugs and writing a comprehensive documentation including examples for many simpler use cases. During the time 2020 to 2023 even external plugins were added for specific areas like physics and chemistry - even though these have not seen the same intense development as the core of the library. I myself came first into contact with the library just before corona, but gave up on it, because of the lack of documentation. Instead I developed some basic animations for my electronics courses using LaTeX. In late 2021 I revisited the project and since then I have used the ManimCE library for many animations from analog and digital electronic circuits and mathematical derivations of complex impedances and linear regression methods to band diagrams in semiconductor devices. In my spare time I have become active in the online ManimCE community as well, where I help new and advanced users to find programmatic solution to their animation ideas.

In this talk I will present some of the animations I have made over the years as complementary teaching material for my students, predominantly in engineering physics. I will discuss my pedagogical ideas and concepts and where I believe these animations find their place. I will also present some concepts utilized by other users of Manim and pose the question which kinds of animations might be more or less useful in conveying the concepts we intend to teach and how to possibly get the most gain from a tool like Manim.