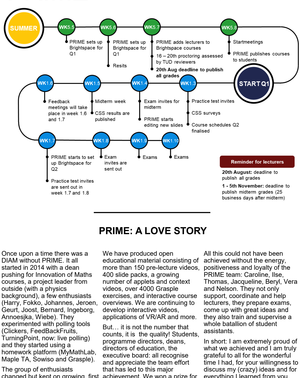
PRIME

Updates & Plans July 2021



PRIME: A LOVE STORY

Once upon a time there was a DIAM without PRIME. It all started in 2014 with a dean pushing for Innovation of Maths courses, a project leader from outside (with a physics background), a few enthusiasts (Harry, Fokko, Johannes, Jeroen, Geurt, Jocelt, Bernard, Ingeborg, Annoeskja, Wiebe). They experimented with polling tools (Clickers, FeedBackFruits, TurningPoint, now: live polling) and they started using a homework platform (MyMathLab, Maple TA, Sowiso and Grasple).

The group of enthusiasts changed but kept on growing, first joined by Dennis, Bart, Ina, Tom, Gerrit, followed by Marleen, Maarten, Sven, Christophe, Niek, Dani, René, Roelof, André, Erdal... and now involves all lecturers@DIAM ... Paul, Emiel, Nikolaas, Nelson, Willem, Marijn, Hans, Eva.

We have produced open educational material consisting of more than 150 pre-lecture videos, 400 slide packs, a growing number of applets and context videos, over 4000 Grasple exercises, and interactive course overviews. We are continuing to develop interactive videos, applications of VR/AR and more.

But... it is not the number that counts, it is the quality! Students, programme directors, deans, directors of education, the executive board: all recognize and appreciate the team effort that has led to this major achievement. We won a prize for developing education in a team, we were nominated for the LDE Henk Dekker award, for the OE global innovation award and the Nationale Onderwijs Prijs. For me the most rewarding result is the fact that we constantly and openly discuss why we teach what we teach, how we teach and to whom we teach: it is a never-ending story.

All this could not have been achieved without the energy, positiveness and loyalty of the PRIME team: Caroline, Ilse, Thomas, Jacqueline, Beryl, Vera and Nelson. They not only support, coordinate and help lecturers, they prepare exams, come up with great ideas and they also train and supervise a whole battalion of student assistants.

In short: I am extremely proud of what we achieved and I am truly grateful to all for the wonderful time I had, for your willingness to discuss my (crazy) ideas and for everything I learned from you.

The future of PRIME starts now!

Annoeskja

LOOKING FORWARD TO THE NEW ACADEMIC YEAR

This is my first contribution to the PRIME Newsletter as the new Programme Manager. I am assuming that most people reading this already know me, but if you haven't met me before, just go to the eighth floor of the EWI building and look for a tall guy with a delightful Flemish accent. Don't hesitate to ask me to get a cup of coffee.

Although the previous year demanded a lot of us and of the students, I must admit that I am looking forward to the academic year 2021-2022. First of all, because of all the incredible things we are working on. In this newsletter you will see some examples of applets and animations that will help students to visualise and understand various concepts in linear algebra and differential equations. Of course, in cooperation with DIAM, we are also building several new MOOCs and we are even writing our own open linear algebra book.

However, what motivates me the most to start this new academic year is knowing that we get another opportunity to provide our students with some excellent courses in mathematics. In all sorts of surveys and meetings students have expressed their appreciation for the way mathematics is being taught at the TU Delft and that is something we should be proud of, especially under these difficult circumstances. So, when the first quarter of 2021-2022 starts in a couple of weeks we once more get the privilege of showing thousands of students how exciting and beautiful mathematics really is.

Tom

NEW LECTURE MATERIALS

An animation about the geometric interpretation of eigenvectors and eigenvalues, in the style of the PRIME linear transformations applet.

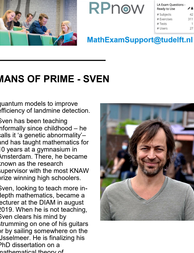
An animation about the geometric interpretation of linear transformations from $\mathbb{R}^2$ to $\mathbb{R}^2$ and back.

The visuals team would like to know which applets and videos you use in your teaching. Especially the ones that are not made by PRIME. How do you integrate them into your course? Please let us know. Feedback on PRIME materials can be posted here.

PRIME EDUCATION AND COVID-19 IN Q1

Lectures will be mostly online, using Virtual Classroom. Using clusters, students from different courses will join in online classes.

Exercise classes will be mainly on-campus, while exams will be held remotely. Exams will be proctored with RPNow while students will continue to have live support from PRIME through MathExamSupport@tudelft.nl. Exams will be primarily in Grasple using the extensive exam repositories.



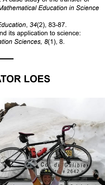
HUMANS OF PRIME - SVEN

Sven speaks as enthusiastically about mathematical models as he does about the different layers of understanding a mathematical concept. Throughout his life, research and teaching have competed for his attention.

Sven studied electrical engineering in Gent, earned his masters degree in mathematical physics at the University of Antwerp, and has done research into the mathematical foundations of quantum physics for more than 20 years at the Free University of Brussels. His research includes the application of the mathematical framework of quantum theory (and in particular its ability to model the context-dependent properties of quantum systems) to model the context-dependent meaning of words in natural language and the use of quantum models to improve efficiency of landmine detection.

Sven has been teaching informally since childhood – he calls it 'a genetic abnormality'– and has taught mathematics for 10 years at a gymnasium in Amsterdam. There, he became known as the research supervisor with the most KNAW prize winning high schoolers.

Sven, looking to teach more in-depth mathematics, became a lecturer at the DIAM in august 2019. When he is not teaching, Sven clears his mind by strumming on one of his guitars or by sailing somewhere on the IJsselmeer. He is finalizing his PhD dissertation on a mathematical theory of observation which he will defend around the turn of this year.



TRANSFER IN PRIME

One of the main goals of PRIME is transfer of mathematics to engineering courses. In general, transfer of learning is defined as using knowledge and skills in another context than the context in which it was initially learned (Britton et al., 2005). Teaching mathematics in context has emerged as a possible solution to foster transfer. According to Gill (1999), however, this only connects a certain mathematical topic to that context. Clearly, transfer is not an easy task. To evaluate the current state of transfer in our education, we developed a pilot study that measures transfer of mathematics in our PRIME courses to some Aerospace courses. In every course pair, we will compare the scores of certain exam questions in which the same mathematical topics are addressed. Preliminary results will follow in a next episode of this newsletter! - By Nathalie

For further reading:

Britton, S., New, P. B., Sharma, M. D., & Yardley, D. (2005). A case study of the transfer of mathematics skills by university students. *International Journal of Mathematical Education in Science and Technology*, 36(1), 1–13.

Gill, P. (1999). The physics/maths problem again. *Physics Education*, 34(2), 83-87.

Nakakoji, Y., & Wilson, R. (2018). First-Year mathematics and its application to science: Evidence of transfer of learning to Physics and Engineering. *Education Sciences*, 8(1), 8.

MEET NEW DIAM COORDINATOR LOES

Loes started the 1st of May as coordinator of the Open Linear Algebra book and the MOOC Pre-Master series Mastering Mathematics for Engineers.

Loes graduated in Algebra and Education at the Radboud University and the National Chiao Tung University. The first essay she wrote for her studies was titled 'I admire numbers, but I believe in people'. This still holds true for her: she is fascinated by the link between the absolute truth and being human, the clear, abstract world and the chaos around us. This fascination is also what led Loes to apply at the TU Delft.

Loes describes herself as a stubborn optimist, cyclist and mountain lover. Previously, Loes set up Klimaat Contact vzw in Leuven, where she lives. There, she coaches people in talking about climate change, in dealing with resistance and in changing the system. If you want to talk about anything related, do not hesitate to contact Loes!

MEDIA TIPS

Are you missing Annoeskja already? Listen to this Podcast podcast episode or watch this interview from the UNLOCKING ... Educators of TU Delft series on YouTube.

Both the video and the podcast feature Annoeskja's two biggest passions: music, and mathematics education.

Book recommendation by Sven

The Godelian Puzzle Book by Raymond Smullyan begins innocently with clear-cut, logical puzzles. The progression from these puzzles to a formal proof of Godels incompleteness theorem is so subtle that it is hardly noticeable. Smullyan is a masterful teacher who makes rigorous proofs accessible to readers of all backgrounds.

COMING SOON...

An applet about the geometric interpretation of systems of differential equations, and their equivalent formulations.

An interactive, branching video in the style of a pre-lecture video. Christophe will take students through true/ false statements and the construction of proofs for Linear Algebra.

An animation about null spaces and column spaces, and what they look like geometrically.

What would you like to read in this newsletter? Let us know here!