Number theory and photography

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Introduction

For an integer n, a set of m distinct nonzero integers with the property that the product of any two of its distinct elements plus n is a square, is called a Diophantine m-tuple with the property $D(n)$ or $D(n)$-m-tuple. The $D(1)$-m-tuples (with rational elements) are called simply (rational) Diophantine m-tuples, and have been studied since the ancient time.
The first example of a rational Diophantine quadruple was the set

$$\left\{\frac{1}{16}, \frac{33}{16}, \frac{17}{4}, \frac{105}{16}\right\}$$

found by Diophantus. Fermat found the first Diophantine quadruple in integers $\{1, 3, 8, 120\}$. Euler proved that there exist infinitely many rational Diophantine quintuples, in particular he was able to extend the integer Diophantine quadruple found by Fermat, to the rational quintuple

$$\left\{1, 3, 8, 120, \frac{777480}{8288641}\right\}.$$

. . . Let me start again.

Introduction

I was thinking of talking about my joint work with Duje and Matija:

A. Dujella, M. Kazalicki and P., *Rational Diophantine sextuples with strong pair*, Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM **119** (2025), Article 36,

but I can talk about this some other time.

During my studies (and before, in high school), I was much more interested in computer science, but thanks to Professor Dujella, I have many results in number theory.

Duje was supervisor for my bachelor's, master's and PhD theses.

I've loved photography since I was little boy, so I'll talk about that too. And there exists some strange connections.

Like many students in Croatia, I choosed Prof. Dujella as my mentor. At that time, I was working many other things, but I was able to complete my studies with work:

Elliptic curves and congruent numbers.

I was just the exactly 100th to graduate from him.

During my studding of his PhD course we had a paper:
Dujella, P., *Square roots with many good approximants*, Integers **5**(3) (2005).



In some books, like:
Dujella, Maretić: Kriptografija, Element, Zagreb, 2007,

or atricles like:
A. Dujella, *A variant of Wiener's attack on RSA*, Computing **85** (2009),

he mentioned my name.

He was also my mentor in my masters thesis:

Periodic continued fractions.

And my PhD thesis:

Householder's approximants and continued fraction expansion of quadratic irrationals.





















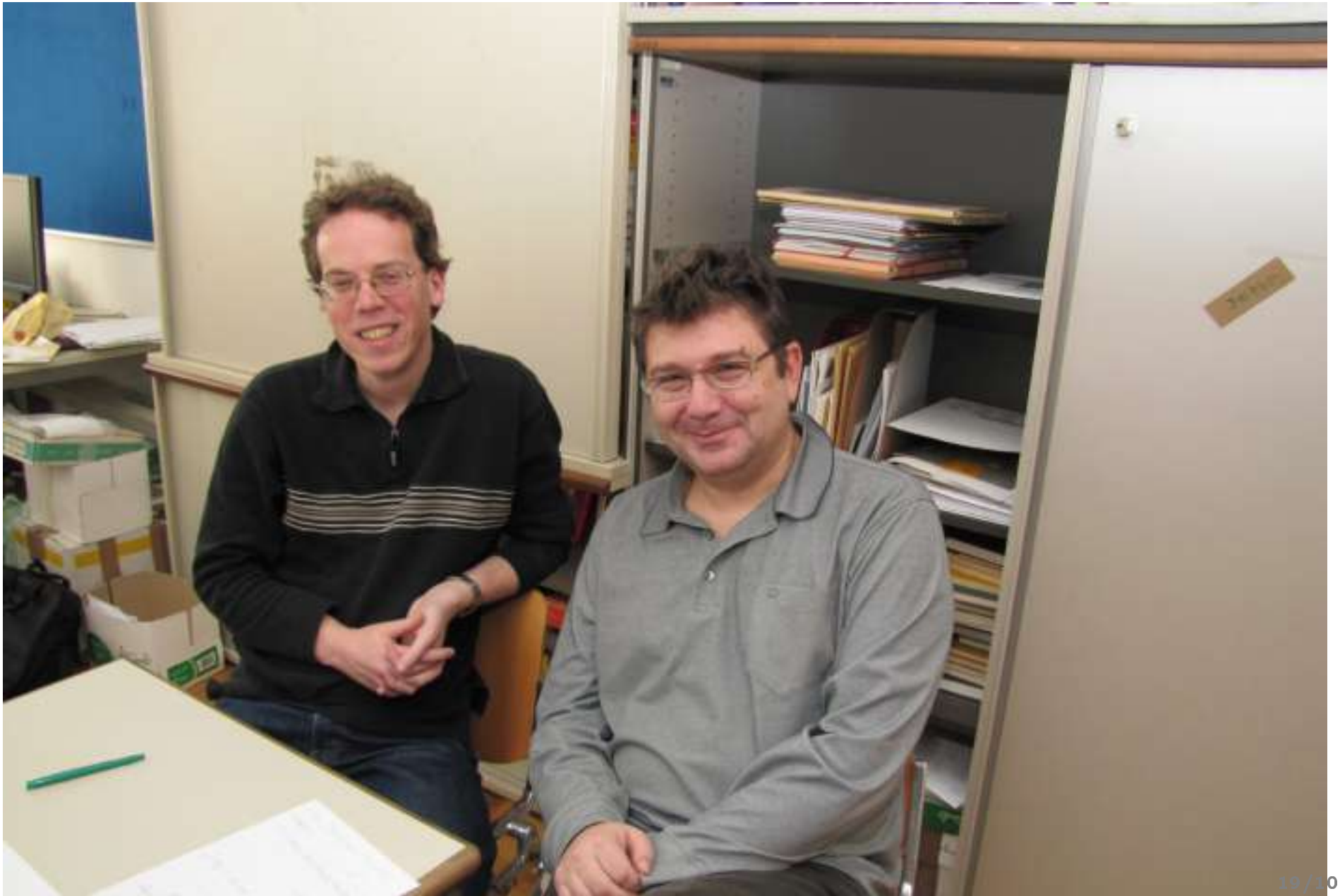
Then I had two papers:

Newton's approximants and continued fraction expansion of $\frac{1+\sqrt{2}}{2}$, Mathematical Communications **17** (2012),

Householder's approximants and continued fraction expansion of quadratic irrationals, Glasnik Matematički **48** (2013)



We also had a good connections with Graz 2011:



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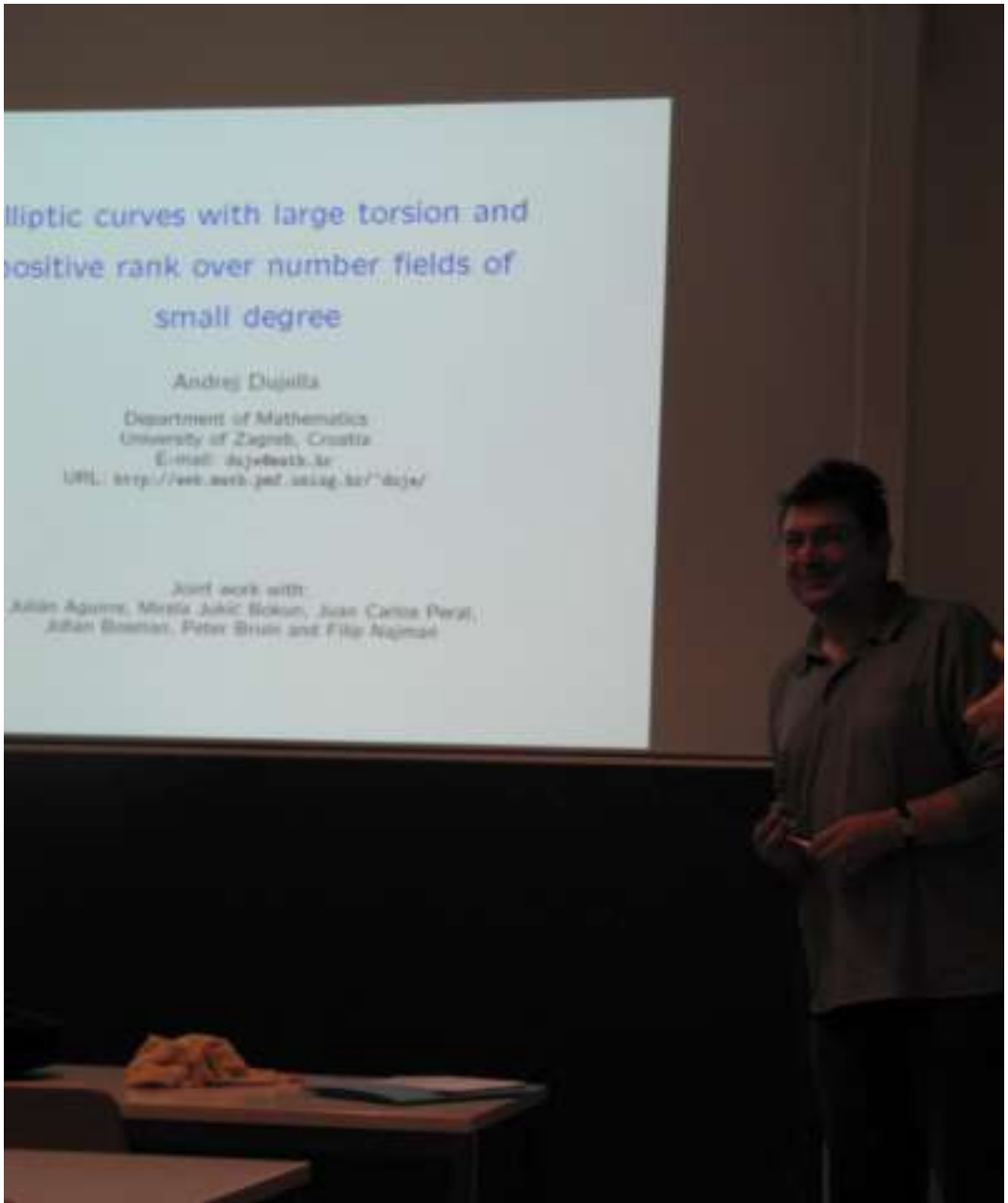
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From that time we have many good photos, like in Eger 2012:



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We also was on the Croatian Mathematical Kongress 2012 in Rijeka:



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Duje was speaking in the Croatioan Academy many times:



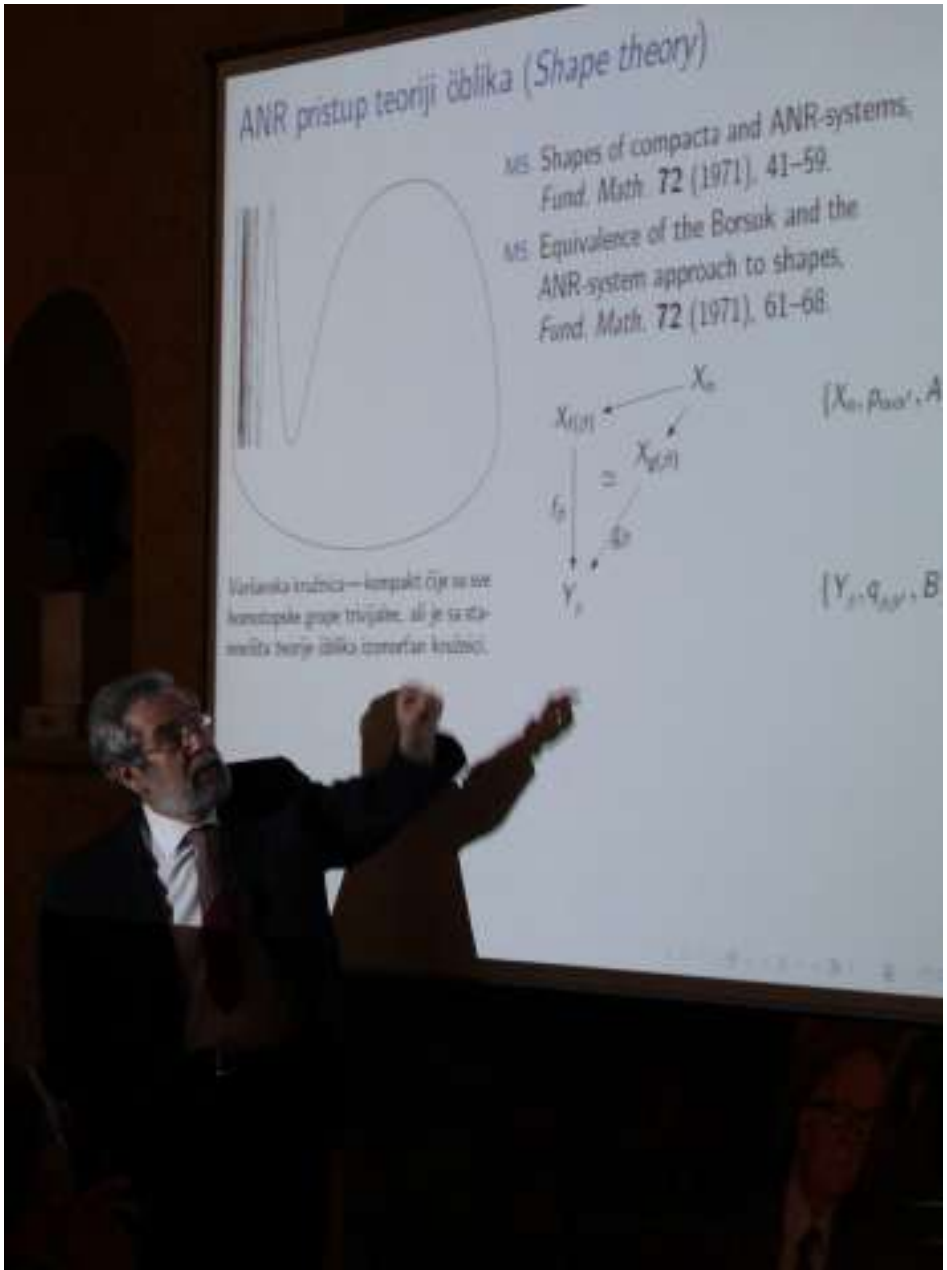
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I could show yout thousands of such photos, but may I show you some other coincidence. Ana Prlić had her PhD defense, on the same day when Duje had his first talk in the Croatian Academy:



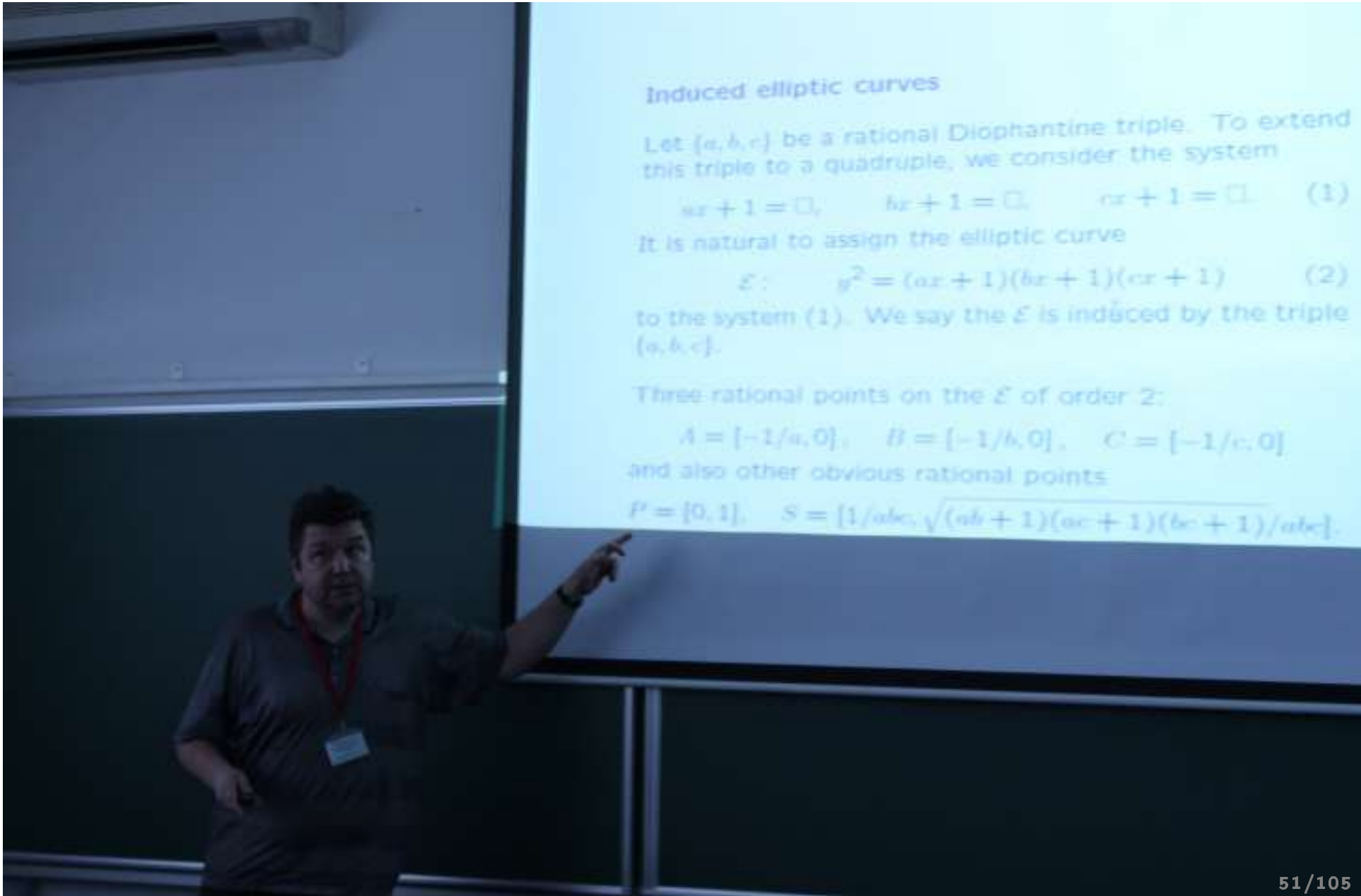
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Duje was the Chief editor of Glasnik Matematički:



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There were good gipsys:




ozujsko
JE ZAKON!

And football team was playing:



And football team was playing::



Duje was singing all the night on parties:



there was also a conference dedicated to prof. Gusić:



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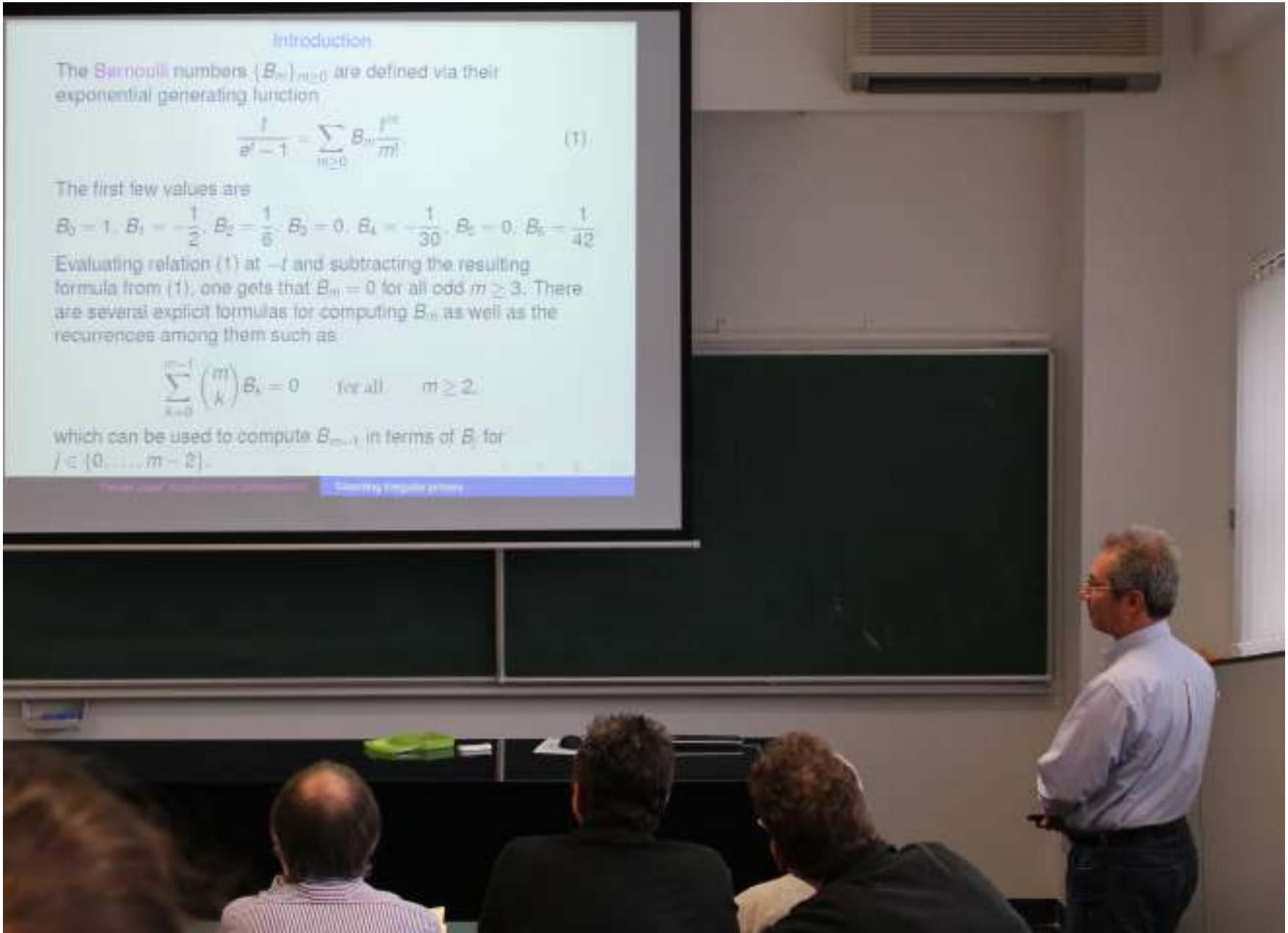
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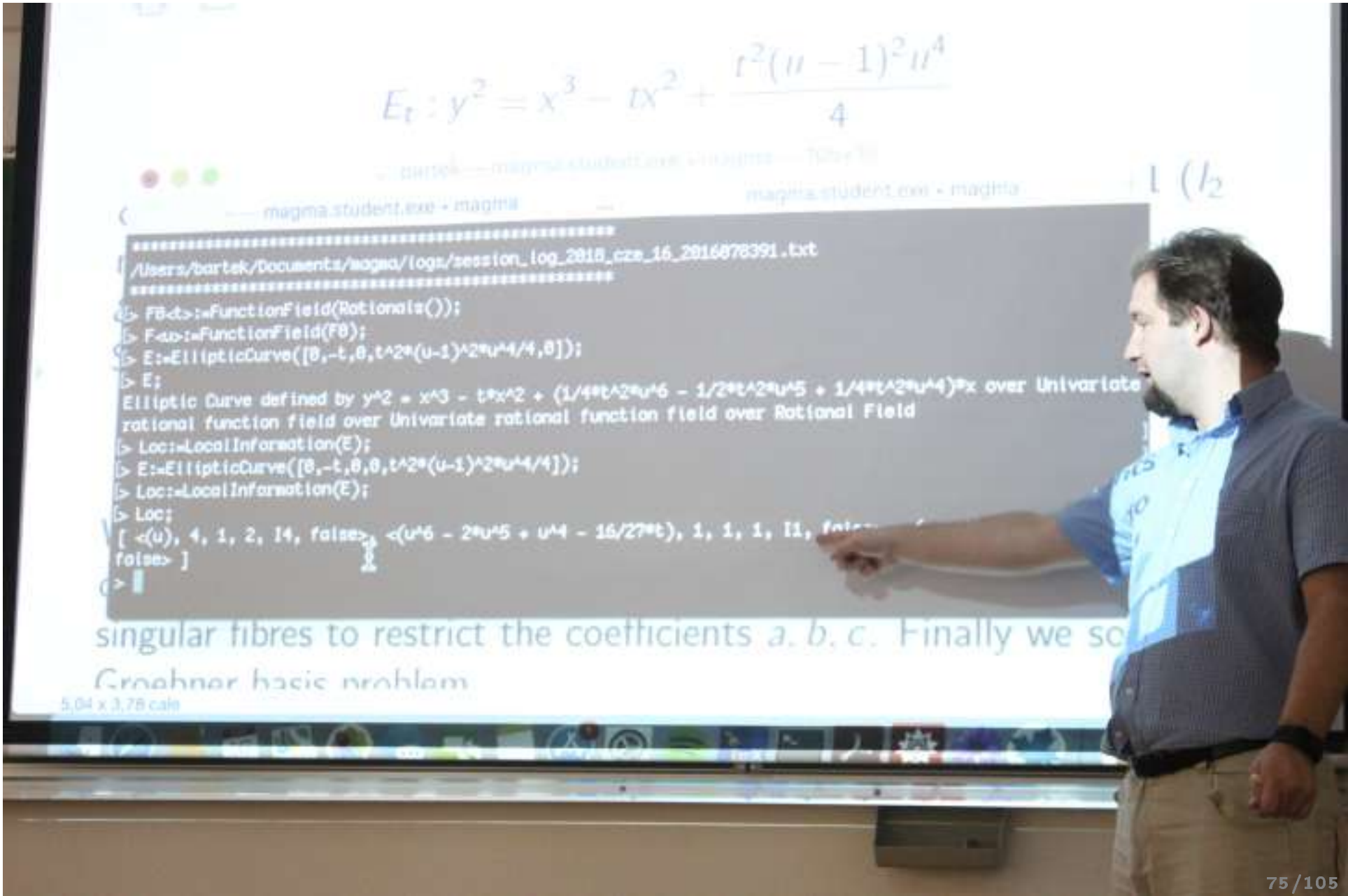
there was also a conference dedicated to prof. Gusić:



and prof. Najman also organized conference:



and all the others:



and all the others:



We was also organizers of conference 2020. in Cryptography:



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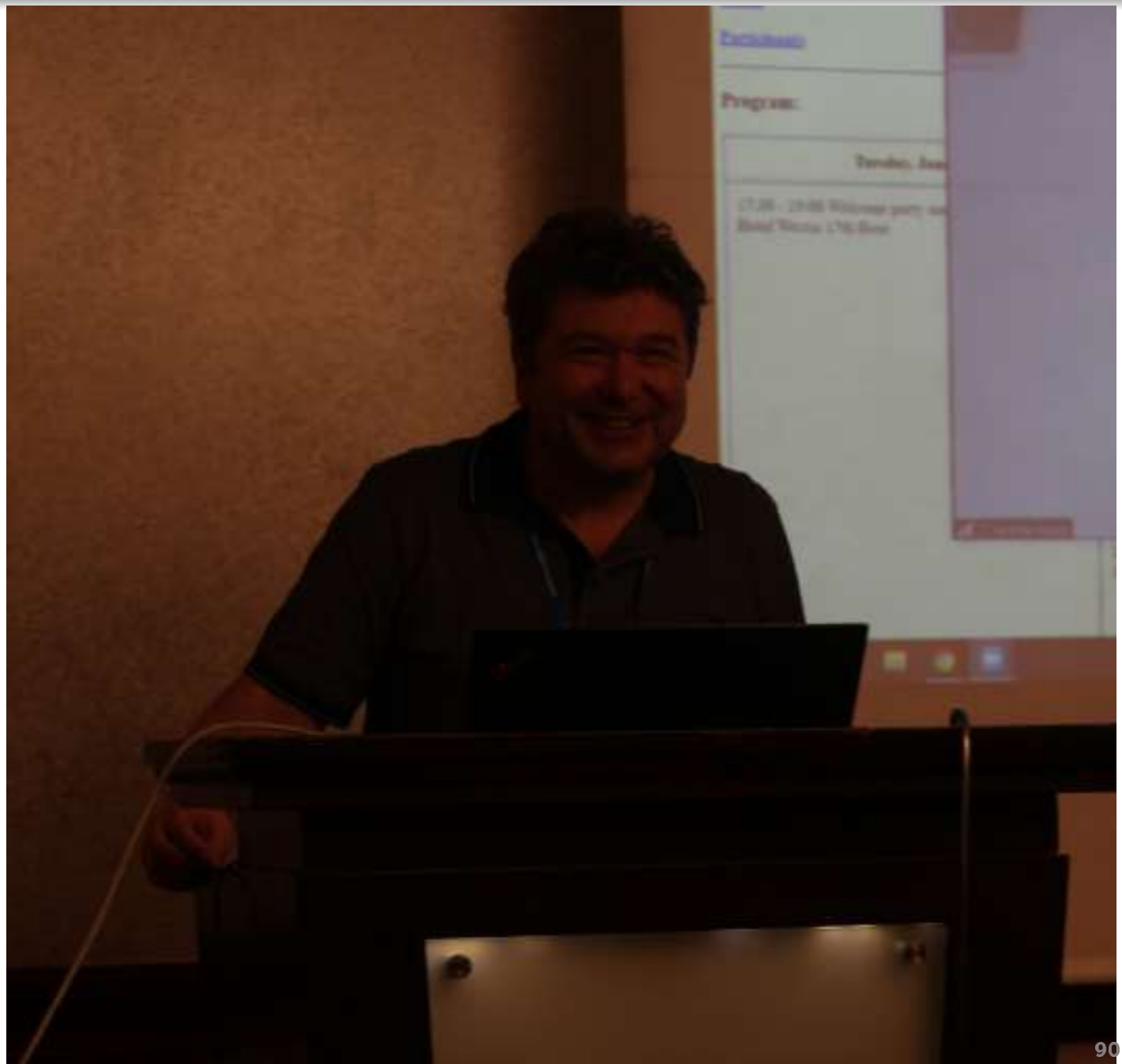


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Program:

Borka is also very good organizer (Split 2022):



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Sometimes, he do it in the town :



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And there are lot of photos from Dubrovnik:



Duje also wrote book Number theory :



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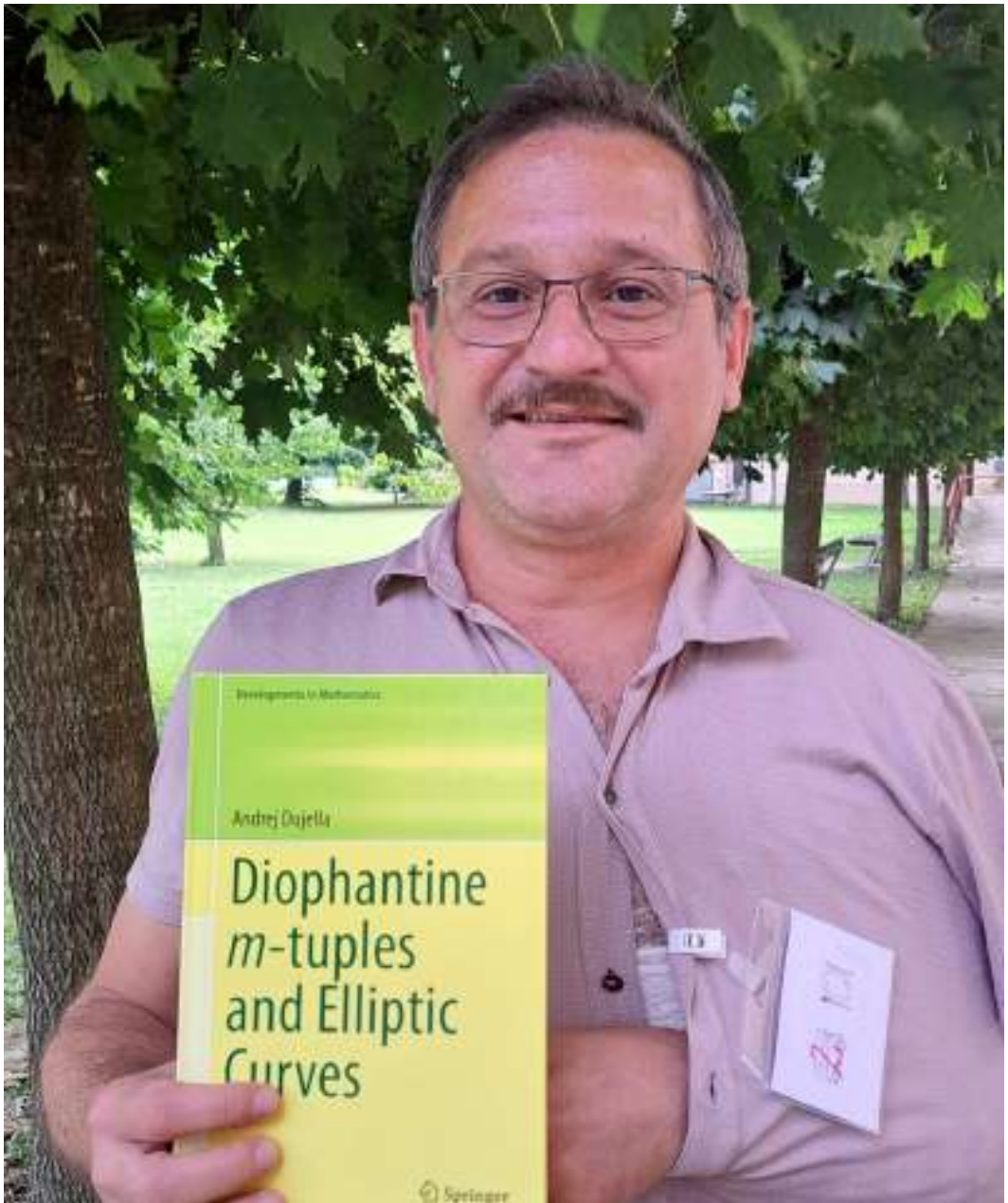
Duje also wrote book Number theory :



Duje also wrote book Number theory :



Duje also wrote book Diophantine m-tuples and Elliptic Curves:



I have many more papers with Duje:

A. Dujella, I. Gusić, V. Petričević and P. Tadić, *Eulerian triples*, Glas. Mat. Ser. III **53** (2018),

A. Dujella, M. Kazalicki and V. Petričević, *Rational Diophantine sextuples with square denominators*, J. Number Theory **205** (2019),

A. Dujella and V. Petričević, *On the largest element in D(n)-quadruples*, Indag. Math. (N.S.) **30** (2019),

A. Dujella and V. Petričević, *Diophantine quadruples with the properties D(n1) and D(n2)*, Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM **114** (2020), Article 21,

A. Dujella and V. Petričević, *Doubly regular Diophantine quadruples*, Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM **114** (2020), Article 189,

A. Dujella, M. Kazalicki and V. Petričević, *Rational Diophantine sextuples containing two regular quadruples and one regular quintuple*, Acta Mathematica Spalatensia **1** (2021),

A. Dujella, Z. Franušić and V. Petričević, *Formulas for Diophantine quintuples containing two pairs of conjugates in some quadratic fields*, Period. Math. Hungar. **85** (2022),

A. Dujella, M. Kazalicki and V. Petričević, *D(n)-quintuples with square elements*, Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM **115** (2021), Article 172,

A. Dujella, M. Kazalicki and V. Petričević, *Rational Diophantine sextuples with strong pair*, Rev. R. Acad. Cienc. Exactas Fis. Nat. Ser. A Math. RACSAM **119** (2025),

During my graduation (in 2003.), I had my first photos of Duje, but unfortunately, I couldn't find them now.

Happy birthday to Andrej Dujella, Ivica Gusić and Borka Jadrijević!!!

Thank you for your attention!