ALEXANDAR BORISSOV YANOVSKI

OBITUARY

After a short illness, Bulgarian mathematical physicist Alexandar Borissov Yanovski passed away on October 27, 2023 at his home in Sofia.
The following are some of the personal reminiscences of Francesco G. Russo.

The Decade 2013–2023 of Alexandar B. Yanovski at the University of Cape Town

The Years 2013–2019

My first visit in South Africa was in 2013, but beginning from July 2014 I had the pleasure to be in close contact with Prof. Yanovski, because we taught together Real Analysis at the University of Cape Town. This was a course with almost two hundred students, so we lectured separately in classes of the same size.

Figure 1. Alexandar Yanovski.

It was my first undergraduate course in the country and we taught it together until 2017, sharing experiences, perspectives and opinions of didactical nature. Prof. Yanovski retired a few years later in 2019, so we shared the teaching experience of one of the largest undergraduate courses of the faculty of science.

For historical reasons and social factors, which is impossible to analyze properly here, it should be noted that it is very peculiar to teach undergraduate courses in South African universities. This is due to a highly inhomogeneous background of the students. One can find extremely talented students and others with poor scientific foundations in the same venue. There are systematically discussions at national level and debates concerning pure mathematics: most of the times these deal with appropriate prerequisites and background in scientific subjects at undergraduate level. It is in fact a delicate topic, which is impossible to describe here, and it is

typical of Mathematics Education, see [1, 3]. Some relevant discussions emerged especially in 2017, see [2].

Therefore it was (and actually is) very special the context of teaching mathematics in South Africa. I and Prof. Yanovski came soon to the agreement that it was crucial to use an appropriate textbook for the course, in order to give the right balance of formalization and intuition, and at the same time it was necessary to privilege a geometric approach for the first concepts of Real Analysis, stressing on the topological aspects of the real line (such as accumulation points, adherence points, uniform continuity and so on). We found a first agreement in [6] and the second was mostly given by jointly written notes and exercises, which were inspired by similar topics in our previous jobs in Brazil, Bulgaria, Italy, Russia and South Africa. The main efforts were spent to give the correct ideas without loosing formalization, but we tried simultaneously to motivate the students to be autonomous and independent as much as possible.

In fact, both I and Prof. Yanovski had previous academic positions in Brazil, so we used to compare several times the experiences which we had when we taught there. It should be also mentioned that the year 2017 was hectic, because of protests, strikes and disruptions of various nature, so we produced additional notes for our students, working remotely (when it was not possible to have the lectures in person) and recording the relevant material in Zoom or Teams.

Somehow "per aspera ad astra". There was no surprise during the successive years of Covid19, when the restrictions imposed the online teaching!

Concerning the research activities of Prof. Yanovski in these years, I shall mention that we did not collaborate as coauthors, but we shared systematically comments and opinions on the mutual research topics. In fact I was mostly concentrated on Topological Group Theory within my research unit in "Topology, Algebra and Dynamical Systems", while Prof. Yanovski worked more on Lie Theory and Mathematical Physics, as illustrated by [8–16]. On the other hand, I used to attend the seminars of his guests and he did the same with mine, so most of the common ground of discussion dealt with dynamical systems, which can be described via methodologies and techniques of Topological Algebra.

The Years 2020–2023

A "leitmotiv" of the frequent meetings that I had with Prof. Yanovski was on the beauty of the mathematics and how this can help to solve unexpected problems of physics. Two more colleagues from the University of Cape Town, namely Peter Bruyns and Francois Ebobisse, were used to share with us their views during the

Figure 2. At Kirstenbosch in 2014. From left to right:
Iliana Yanovska, Francesco Russo, Giovanni Russo and Alexandar
Yanovski.

Figure 3. After a walk in the Table Mountain in 2022 – Alexandar
Yanovski (left) and Francesco Russo (right).

Figure 4. At Kirstenbosch in 2018. From left to right: Alfonso Maria Russo, Giovanni Diamante Russo, Iliana Yanovska, Riccardo Marcellino Russo and Alexandar Yanovski.

coffee breaks, or during the walks in the Table Mountain of the weekend. I and Prof. Yanovski also started to discuss some ideas, which are contained in [5], to possible applications to certain notions in [4], but there was never the time to go ahead properly, since his retirement arrived in 2019 and later Covid19 changed the social behaviours for a couple of years.

Last time that I met Prof. Yanovski and his wife was once in 2021 and in two more occasions in 2022. During these years he was mostly in Sofia, even if his visits to Cape Town were in connection with the local holiday season, which corresponds to the winter in the Northern hemisphere. I was expecting his visit in November 2023, but he suddenly passed away, so I felt appropriate to contribute to his memory with the present note.

I want to end by noting that we shared somehow a mathematical perspective which gave priority to Geometry, looking at it as a bridge between Functional Analysis and Mathematical Physics. I think that this perspective can be due to different motivations, or even to natural inclinations, but for sure Prof. Yanovski was influenced by the Italian School of Theoretical Physics of Bruno Pontecorvo, since his PhD was defended in Dubna, where Pontecorvo was active from 1950 to 1993, see [7]. Of course, Pontecorvo and the "ragazzi di via Panisperna" gave a strong preference to the role of the geometry in their scientific contributions, and I like to think at Prof. Yanovski and his colleagues of Dubna of the same period as a second generation of "ragazzi di via Panisperna".

References

[1] Adler J., Alshwaikh J., Essack R. and Gcsamba L., *Mathematics Education Research in South Africa 2007–2015*: *Review and Reflection*, Afr. J. Research Math. Sci. Techn. Edu. **1** (2016) 1–14.

[2] Andersen C. and Knudsen B., *Affective Politics and Colonial Heritage, Rhodes Must Fall at UCT and Oxford*, Int. J. Heritage Studies **25** (2019) 239–258.

[3] Gerber A., Engelbrecht J., Harding A. and Rogan J., *The Influence of Second Language Teaching on Undergraduate Mathematics Performance*, Math. Ed. Res. J. **17** (2005) 3–21.

[4] Gerdjikov V., Vilasi G. and Yanovski A., *Integrable Hamiltonian Hierarchies*: *Spectral and Geometric Methods*, Lecture Notes in Physics 748, Springer, Berlin 2010.

[5] Herfort W., Hofmann K.-H. and Russo F., *Periodic Locally Compact Groups*, de Gruyter, Berlin 2019.

[6] Lang S., *Undergraduate Analaysis*, Springer, Berlin 1997.

[7] Mussardo G., *Maksimovič*: *La Storia di Bruno Pontecorvo*, Castelvecchi, Roma 2023.

[8] Valchev T. and Yanovski A., *Solutions to a Vector Heisenberg Ferromagnet Equation Related to Symmetric Spaces*, Geom. Integr. Quantization **20** (2019) 285–296.

[9] Valchev T. and Yanovski A., *Pseudo-Hermitian Reduction of a Generalized Heisenberg Ferromagnet Equation I*: *Auxiliary System and Fundamental Properties*, J. Nonlinear Math. Phys. **25** (2018) 324–350.

[10] Valchev T. and Yanovski A., *Pseudo-Hermitian Reduction of a Generalized Heisenberg Ferromagnet Equation II*: *Special Solutions*, J. Nonlinear Math. Phys. **25** (2018) 442–461.

[11] Yanovski A., *Hierarchies of Symplectic Structures for $\mathfrak{sl}(3,\mathbb{C})$ Zakharov-Shabat Systems in Canonical and Pole Gauge with $\mathbb{Z}_2 \times \mathbb{Z}_2$ Reduction of Mikhailov Type*, Geom. Integr. Quantization **20** (2019) 297–310.

[12] Yanovski A., *Some Aspects of the Spectral Theory for $\mathfrak{sl}(3,\mathbb{C})$ System with $\mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$ Reduction of Mikhailov Type with General Position Boundary Conditions*, Geom. Integr. Quantization **17** (2016) 379–391.

[13] Yanovski A., *Recursion Operators for Rational Bundle on $\mathfrak{sl}(3,\mathbb{C})$ with $\mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$ Reduction of Mikhailov Type*, Geom. Integr. Quantization **16** (2015) 301–311.

[14] Yanovski A., *Locality of the Conservation Laws for the Soliton Equations Related to Caudrey-Beals-Coifman System via the Theory of Recursion Operators*, Geom. Integr. Quantization **15** (2014) 292–308.

[15] Yanovski A., *Locality of the Conservation Laws for the Soliton Equations Related to Caudrey-Beals-Coifman System*, J. Geom. Symmetry Phys. **33** (2014) 91–107.

[16] Yanovski A., *Recursion Operators and Expansions over Adjoint Solutions for the Caudrey-Beals-Coifman System with $\mathbb{Z}_p$ Reductions of Mikhailov Type*, J. Geom. Symmetry Phys. **30** (2013) 105–120.

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