

The Art of Mathematics alongside the Art of Literature – the achievements of Sofia Kovalevskaya and Elena Ventzel

There exists a stereotype claiming that mathematicians are logical, rational people while those of art are emotional and idealistic. As all stereotypes, this one is rather restricted and often incorrect. Many mathematicians, physicists, engineers, computer scientists write poems, play musical instruments, paint, and sing as a hobby. However, it is truly exceptional when a person works professionally at high levels in both of these fields.

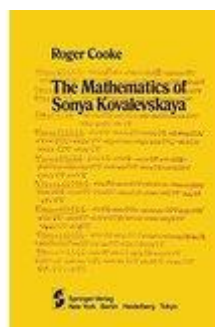
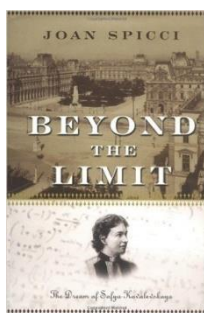
In the framework of this workshop, I will speak about two female mathematicians who also established themselves as significant writers.

The first one is Sofia Kovalevskaya (1850-1891).



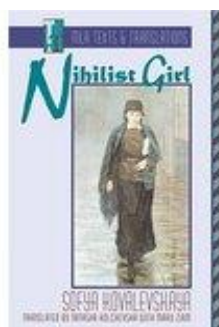
Her name is of landmark nature in the history of women in mathematics. Not only did she make outstanding contributions to mathematics, but also played a remarkable role in opening the gates to mathematical education for women since in the 19-th century most of the European and all of the Russian universities did not accept any female students. To receive professional mathematical education, at the age of 19, Kovalevskaya left for Germany where professors had the right to allow female students to take their courses without formal enrollment. There, at the university of Heidelberg, Kovalevskaya took courses from such prominent mathematicians as Helmholtz, Kirchoff, and Königsberger. Later on, she moved to Berlin, where she studied with Karl Weierstrass. This famous mathematician considered Kovalevskaya as one of his most talented students. In 1874, she received her PhD degree from the Höttingen University with the "highest honour". Her thesis included works on partial differential equations (the Cauchy-Kovalevskaya theorem), Abel integrals, and mechanics of hyroscope. Despite these truly outstanding results, Kovalevskaya was unable to find a university position either in Russia or in Europe due to the same gender discrimination. It was only in 1883, when G. Mittag-Leffler arranged an invitation for her to become a 'docent' at Stockholm university and, in 1884, she became the first female mathematics professor in Europe. Sofia Kovalevskaya's prominent life and extraordinary career in mathematics opened the gates to university education for women and made her one of the milestone figures in the history of mathematics.

In fact, her short yet brilliant life deserves a more serious analysis and it has been done in many books as well as in a few films.

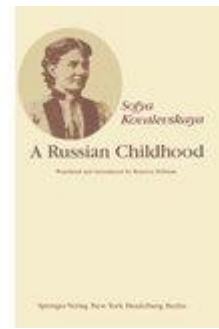
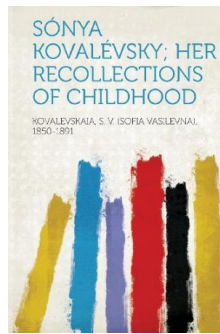


Here, I would like to speak only about her activities which are far less known.

Sofia Kovalevskaya was a talented and recognized writer. Her books are still being published and new editions and translations are coming out. On this slide, you can see a screenshot from the "amazon.com" website. "Nihilist Girl" was first published in Sweden in 1892, but is still popular, especially among romantic youngsters. The book has such merits as a valid love story, excellent style, beautiful landscape descriptions, and high-principled ideas of humanity. The main character is an idealistic girl who sacrificed her future and comfort to save a life of a human rights activist. The book has been translated into several languages, including English, German, French, Sweden, Polish, Ukrainian, and Czech.



The other book, "Recollections of childhood" appeared in 1890 and can be regarded as a portrait of the environment, where little Sofia lived. There, we read: "At the age of 12, I was absolutely positive that I was going to be a poet". Although her attempts in poetry remained amateurish, the recollections themselves in the opinion of specialists can be levelled with some works of Lev Tolstoy and Ivan Turgenev.



The book describes a funny episode about Sofia's earliest impulse to study mathematics. When their home was undergoing restoration, the workers used old lecture notes as a foundation for wall-papers. These lecture notes were student's notes on mathematics and the little girl was so fascinated by mathematical symbols that she memorized formulae by sight and could reproduce them by just drawing. Interestingly, those notes were lectures of M. A. Ostrogradskii on mathematical analysis.

Apart from that, in her essays Kovalevskaya displayed bright portraits of contemporaries, among which were F. M. Dostoevsky and George Elliot.

Regrettably, due to the untimely death of Kovalevskaya, many of her works in literature remained unfinished or just as drafts. In addition to the books mentioned above, a complete collection of her literary inheritance includes some critical articles on theatre performances with deep analysis of plays, their directions and actors' presentations, popular papers on science, and drafts of plays. Her epistolary exchanges worth mentioning separately, especially correspondence with K. Weierstrass, Ch. Hermite, G. Mittag-Leffler, and other mathematicians.

In short, although Sofia Kovalevskaya will always be remembered and honored mainly for her outstanding achievements in mathematics and mathematical education, her books and essays show without doubt that her name also takes its deserved place in the world literature.

Another woman, whose name will always remain both in mathematics and literature, is Elena Ventzel (1907-2002) whose pen-name is Irina Grekova. ("Igrek" is a Russian pronunciation of Latin "Y"). In distinction from Kovalevskaya, Elena Ventzel's popularity is first of all attributed to her writings rather than mathematics. Once published, her books became bestsellers immediately. Ventzel herself was elected as a member of the USSR Union of Writers.



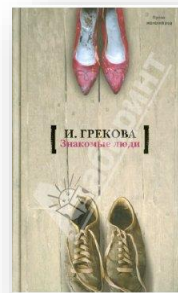
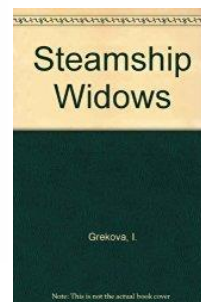
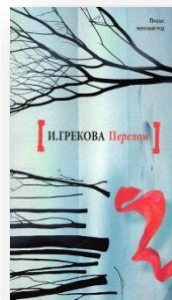
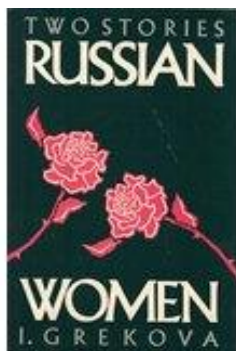
Let us briefly outline her biography. E. Ventzel was born in Tallinn (Estonia). She obtained her mathematical education in St.-Petersburg (Petrograd), where she graduated from the Faculty of Physics and Mathematics in 1929. In 1935, she and her husband moved to Moscow, where she worked during 33 years as an academic staff member of the Zhukovsky Air Force Engineering Academy, one of the strongest research establishments related to air and space research. There, Ventzel progressed from an assistant to become a full professor. Her research interests included probability theory, stochastic processes, mathematical statistics, operations research and their various engineering applications. She was a superb educator and due to her invaluable contributions, these courses were modernized, complemented with new developments, and adjusted to the rapidly developing information and computer sciences. In 1969, after she retired from the Academy, Ventzel worked as a professor and then a consultant-professor in Moscow State University of Railway Engineering until 1987. Elena Ventzel died in 2002 after living a long life full of events, changes of epochs, tragedies and achievements.

In these slides, we can see some of her textbooks. The publisher “Science” was a leading Soviet publishing house of scientific literature. All of these texts demonstrated truly innovative approaches and insights. Nowadays, they are still important despite the fact that a great number of new textbooks based on the same ideas and interdisciplinary connections have appeared. The tribute of developing those undoubtedly belongs to Elena Ventzel.



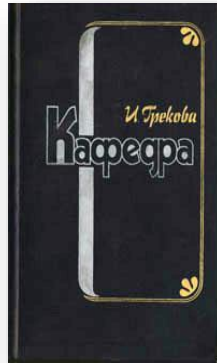


However, her name as a mathematician is known only to academicians, mostly mathematicians and those applying mathematical methods in engineering. Meanwhile, in the Soviet Union starting from the 60's, the name of Irina Grekova was known to all book readers, even those remote from mathematics. And very few people knew that this name was pertinent to the mathematics professor from Zhukovsky Academy.



As soon as they were published, her works gained instant popularity. People read them on the buses, in metro trains, waiting in queues, and, of course, at home. Let us look briefly at some of these works.

“The department” (1978) is about lives of people working in the department of mathematics in a big university. The author describes departmental meetings, personal affairs of the staff members, some hidden sides of their family lives, students and their life in dormitories. There are many vivid emotional episodes, flashbacks, and intrigues; together with the characters, the reader journeys through love, kindness, loneliness, humour, and sadness, that is, the entire spectrum of human nature.



“The department” is a real masterpiece. The book was rewritten as a drama and staged in a few theatres, and later on in 1982, it appeared as a film, for which Irina Grekova co-authored a screenplay.



Another significant work by Grekova is “The hotel manager” (1976).

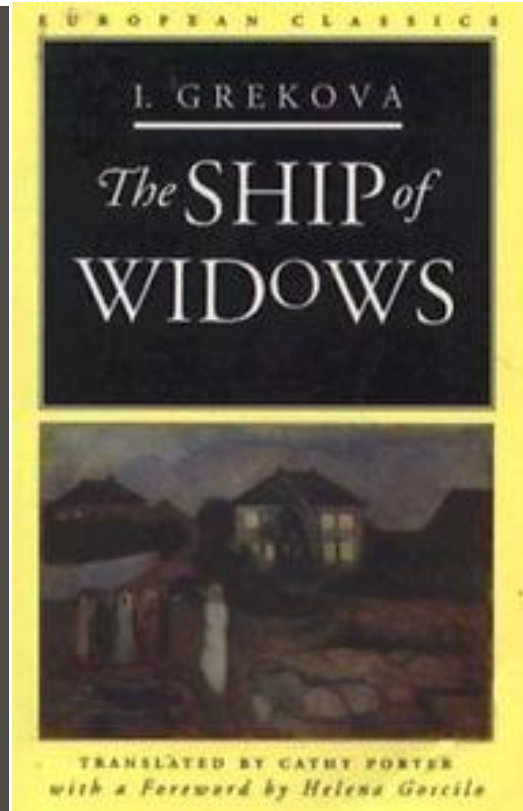
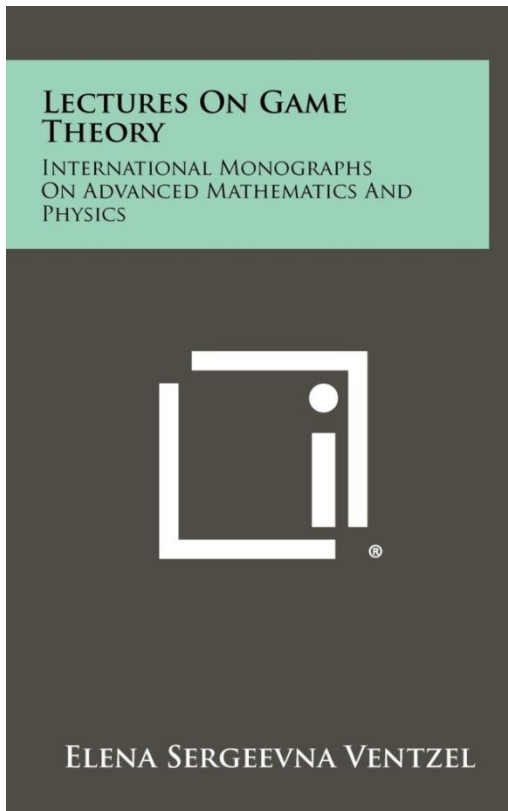


This is a saga depicting the life of an ordinary girl from a small town who married a military officer and went with him through many difficulties, ordeals, hardships. The story describes through one ordinary life, the whole epoch in the Soviet Union era, the atmosphere in the society and the impact of major events on one simple life. This book was also made as a film under the title “Blessing the woman” (2003) directed by a reputable director Stanislav Govorukhin, who is one of the masters of modern cinematography. This work was awarded at several film festivals. Here are some pictures from the film.



Another recognized book by Irina Grekova is “The ship of widows”.

In the next slide, we can see a picture from “amazon.com” website. Currently, this book is being sold within the series “The European Classics” (English translation). At the moment, there are two books by Elena Ventzel=Irina Grekova offered by “amazon”:



“The Game Theory” (E. Ventzel) and “The ship of widows” (I. Grekova).

Rather an extraordinary situation!

“The ship of widows” was published in 1981. It is a very masterful description of a communal flat, where several women who had become widows during WWII resided. The book constitutes a deep drama, where all kinds of human feelings are depicted, ranging from the lowest greed, envy, wickedness to the highest courage, kindness, real generosity, nobleness, and love. The book gained enormous popularity and was translated into many languages. It is no surprise, therefore, that the book was turned into a screenplay and in 2010 the film directed by Stanislav Mitin appeared on the screen. In all countries, where Russian is used, the film was watched on TV and the audience voted it as “an event of the week”. Stanislav Mitin is one of directors specialized on subtle psychological films, and the cast includes such celebrities as Tatyana Lyutaeva and Olga Fadeeva. Needless to say, this film also received awards in a number of film festivals.

Here are some pictures:





On the whole, writer Irina Grekova, alias mathematics professor Elena Ventzel, published 12 novels and a few collections of short stories which have been translated into many languages. Despite today's rapidly changing life environments, her books remain in constant demand by readers since they are written with great talent and deal in depth with everlasting problems which will be of interest as long as mankind exists.

I hope these two stories have revealed some new aspects within the scope of this workshop.

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R. P. Ventzel, G. L. Epstein. "E. S. Ventzel – I. Grekova", Moscow, Yunost 2007.