

Josip Pečarić-and his life in mathematics and politics

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Dedicated to the 70th anniversary of
my dear friend and colleague Josip Pečarić

- When one speaks on the occasion of someone's 70th birthday and lifetime achievements it should be clear what are the main interests of personal activities.
- In the case of Academician Josip Pečarić, supposing you know that he is a great mathematician, you can look at the MathSciNet and find that...



- the **1st** paper: G.V. Milovanović, J.E. Pečarić, Some considerations on Iyengar's inequality and some related applications. *Univ. Beograd. Publ. Elektrotehn. Fak. Ser. Mat. Fiz.* No. 544-576 (1976), 166–170.
- --interpolate **1185** items (of which 21 books with the number of citations: $537 > 385 > 343 > 140 \dots$)
- the **last** paper: S. Ivelić Bradanović, N. Latif, Đ. Pečarić, J. Pečarić, Sherman's and related inequalities with applications in information theory. *J. Inequal. Appl.* 2018 Paper No.98 , 21 pp.

1. The King of Inequalities

Pers(s)onally
and many with me
regard him as
THE KING OF INEQUALITIES
and we are proud
to work in his country.



MIA 2008, Trogir

- In such a situation it is likely that it will never occur to you to search for any other publicly visible activity after this insight. But for the purpose of thorough CV you can perform a Google search, and soon you realize that related to the name Josip Pečarić appear some books also with a non-mathematical titles. You can classify these books as historical, political, maybe even sociological ones.
- Since names and people are not in bijective relation it is highly probable that you will disregard this, which many people in Croatia actually also do.

- But as a mathematician you continue to verify the hypothesis that these two Josip's are actually two different Josip's. As a final step you maybe search also in Wikipedia where there are two lists of books. One is easily recognizable as a list of math books and the other list (although in Croatian) has no academic titles etc.
- Hence your hypothesis broke down and the two Josip's collapse in one. Moreover, you find that there are indeed 43 non-mathematical books published from 1998-2018. REMARKABLE
- So, among other anniversaries, we celebrate also 20 years from publishing his first non-mathematical book.

- This is almost beyond comprehension, if you don't know Josip. But if you had a chance to knowing him and, even is better, to work with him, these outcomes assume more human shapes.
- His mind never sleeps, always working, searching for problems, quickly switching subjects, searching for solutions, tricky and, afterwards, seemingly simple solutions, or in the words of R. P. Boas Jr. (who was a member of the committee at his PhD dissertation defense 1982):

- “Pečarić has systemized enormous amount of material which was published in years and which became more and more chaotic. This systematization itself is a valuable part of the work.
- Secondly, Pečarić has shown great ingenuity in finding simpler proofs of some inequalities and appropriate generalizations. As a result many inequalities became easily understood. He also unified some previously non-related inequalities.
- And, finally, he gave many original contributions to the field of inequalities.”

- Summing up my initial remarks I again pronounce that it is impossible in my limited time to give a fair picture of the remarkable man, great mathematician and a human being as Josip Pečarić. My intention is instead to complement the picture of Josip in various ways.
- Especially, in addition to his obvious role as king of inequalities I also hope that my lecture will give some flavour of Josip as family man, fighter, supervisor, international authority (Australia, Pakistan, Sweden etc), fan of the Croatian football team, etc

Josip- fan of the Croatian football team

MIA 2008 Trogir



LEP- fan of a football too



Josip wearing Bokelj Mariners solemn suit

- This is traditional Bokelj Mariners solemn suit from the year 809



2. The first steps

- Josip Pečarić was born in 1948 in town Kotor (Boka Kotorska bay) where he finished elementary and high school.
- His mother Ivica Tulić was a housewife
- His father Ermenedildo Pečarić worked as a postman and later in a restaurant as a waiter.
- They were simple and hardworking family with three children. Josip was the youngest child.

Boka Kotorska bay



Kotor



Josip- young boy



Josip with his friends and relative

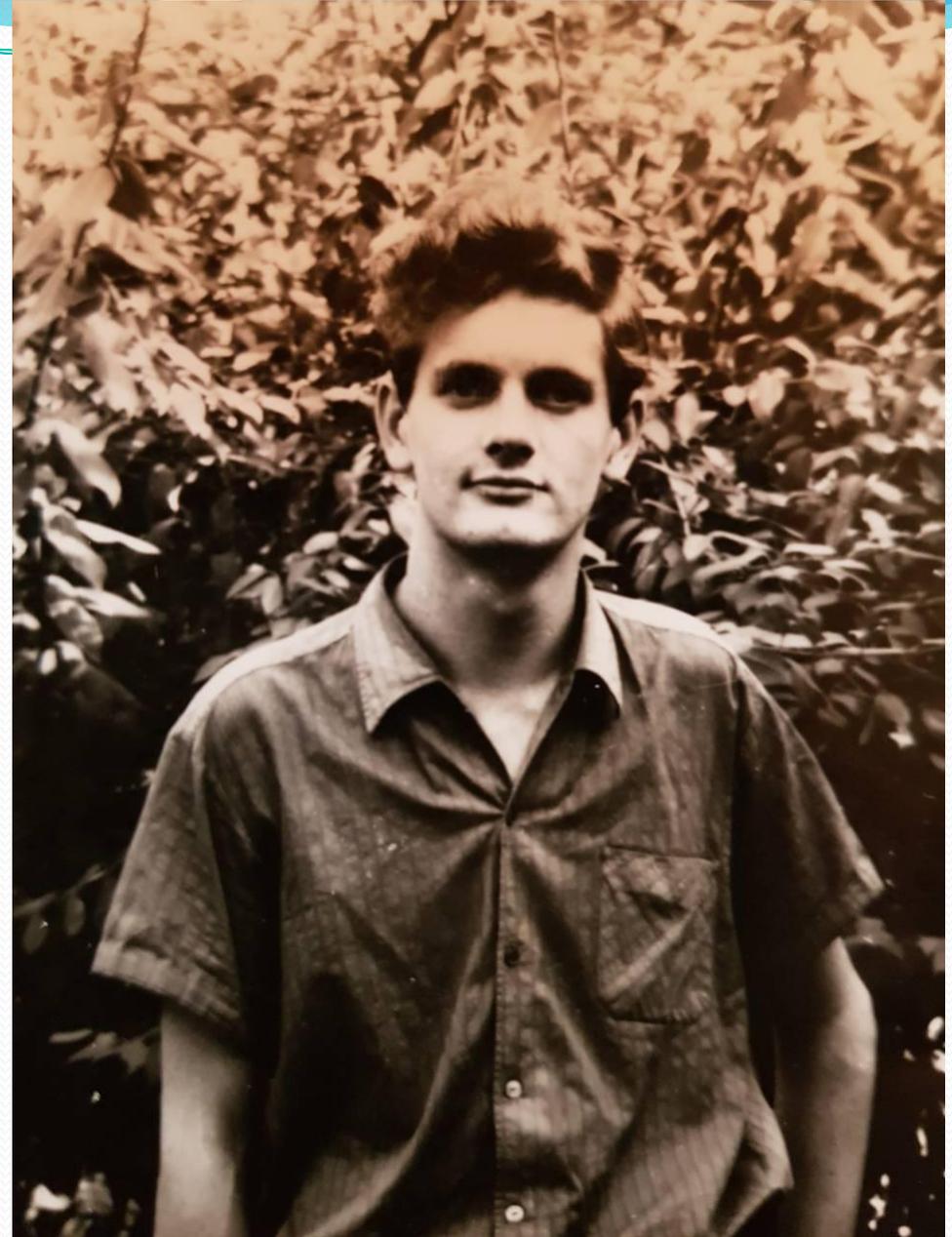


3. The early career

- Josip started studying at the Faculty of Electrical Engineering in Belgrade. One of the professors of mathematics at that faculty was Professor Dragoslav Mitrinović, and most talented mathematicians decided to study at that faculty just because of him.
- He also took master's degree in electrical engineering (with supervisor also a mathematics professor on that faculty, Professor Dobrilo Tošić), but after that he decided to dedicate himself to pure mathematics.

Josip-young student

- Beograd, 1968



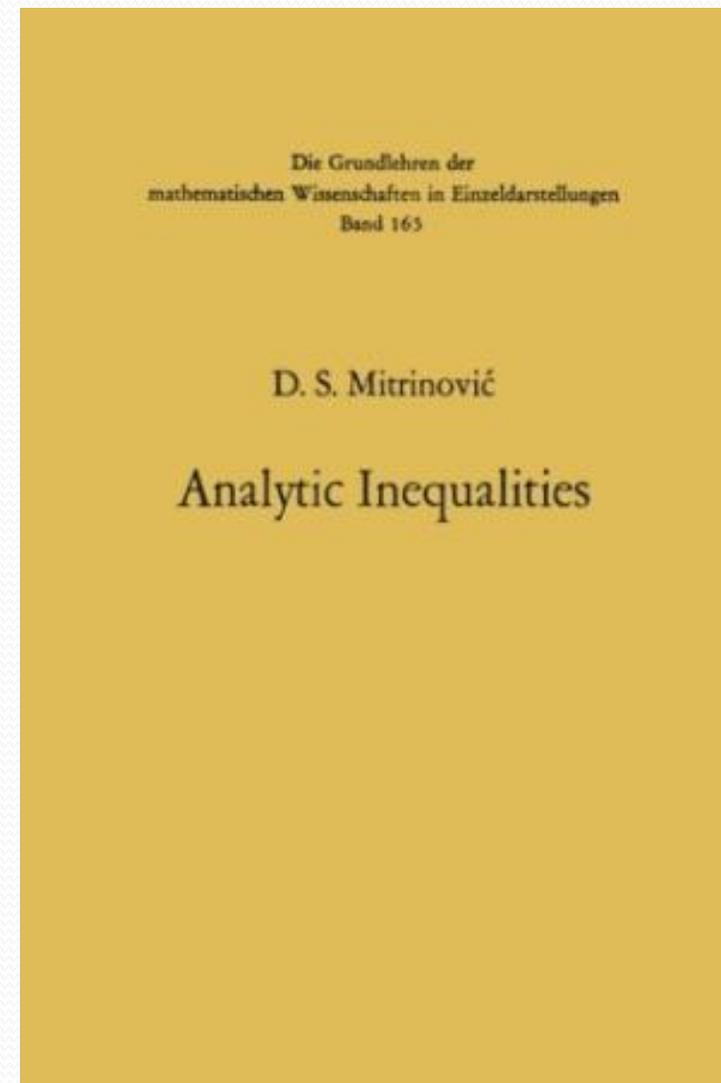
Graduation day



- At the time Gradimir Milovanović (now Academician in Serbia) took his doctoral degree and Professor Tošić gave to Josip a copy of his doctoral thesis, and together with Gradimir Milovanović he wrote his first two articles in 1976. Professor Mitrinović then invited him to work on doctoral thesis.
- This was a great privilege (in Josip's own words). Remember that Mitrinović published his famous book in Springer Verlag, 1970. Josip finished the work on the thesis in 1979, but he managed to win the degree only in 1982 after a series of attacks on his work.
- He couldn't get a position as an assistant professor, although he had more articles than his opposing candidates. These were indeed hard times for Josip Pečarić.

Josip Pečarić's mentor

Dragoslav S. Mitrinović
and his famous book



At Faculty of Electrical Engineering



PhD graduation ceremony



4. The family

The family is very important for Josip. Many times he used to say that his family is a victim of his passions (it is clear by now that these are mathematics and politics). Ankica and Josip founded their family in 1970.



Ankica and Josip with Stjepan Selak



Josip and Ankica with her sister



Daughter Dilda



Daughter Ivana



Daughter Andela



Josip with Đilda, Ivana, Anđela

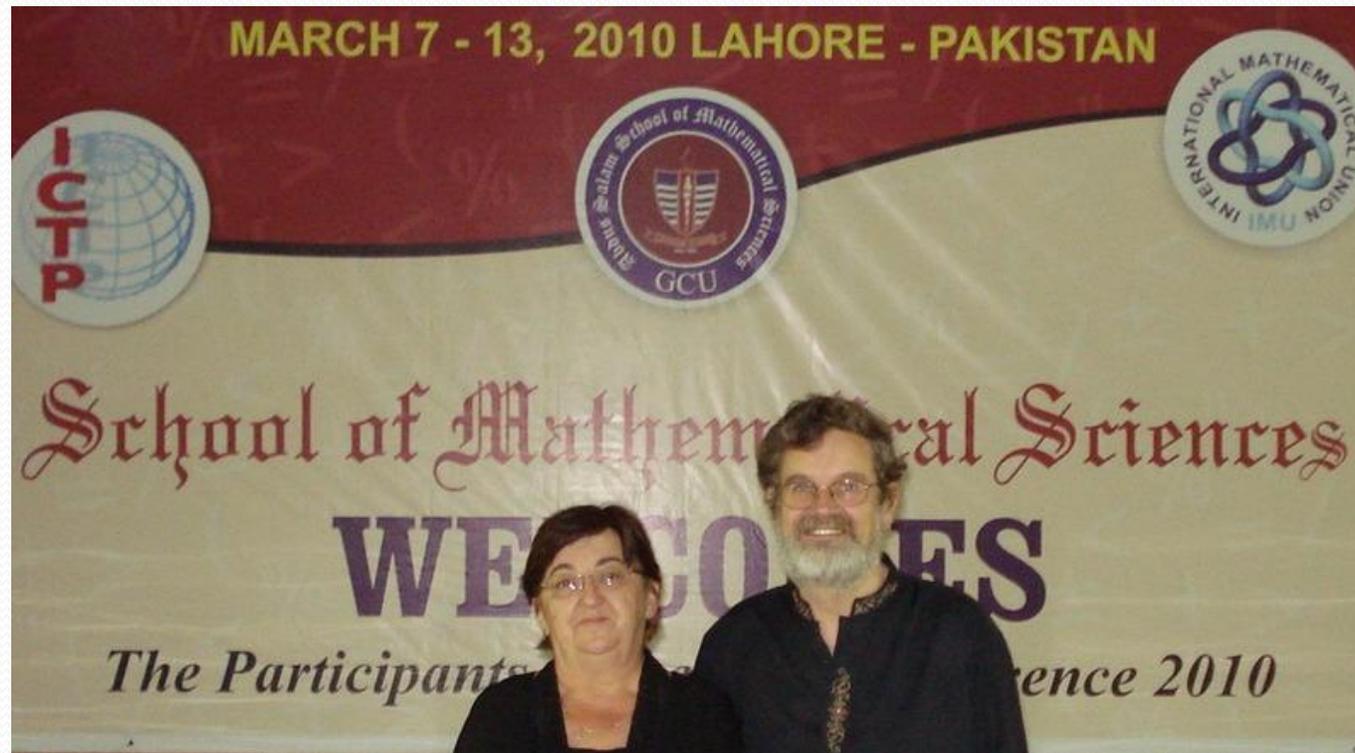


Josip with grandsons



Ankica, Josip, Lahore, Pakistan, MIA2010

- It is not known if there was any conference or any kind of scientific travel where Josip was without his wife Ankica.



CroMC2004, Split, Croatia



ICAM 2006, Plovdiv, Bulgaria



CIA 2007, Noszvaj, Hungary



MIA 2008, Trogir, Croatia



MIA 2012, Jinju, South Korea



MIA 2014, Trogir, Croatia



MIA 2014, Trogir, Croatia



MIA 2014, Trogir, Croatia



MIA 2015, Mostar, Bosnia and Herzegovina



5. The continued career in Zagreb

In 1987 he moved to University of Zagreb where he was immediately appointed and employed as associate professor, and he very soon became a full professor.

The rest is just a remarkable history. Mathematicians are anywhere a wild bunch, so he had to struggle for his place in Croatian mathematical community but now in entirely different environment. The mathematical school in Croatia was very different from that in Belgrade. Major topics were topology and shape theory, functional analysis, representation theory, geometry and foundations of mathematics (logic). These topics were still under influences of old schools from Austro-Hungarian Empire.

- It was not easy to convince to contemporary fellow mathematicians that inequalities are worthwhile for researching as independent subject. Of course, everybody used inequalities, but to establish it as a separate field was a different story. After a while he managed to do that (in some sense).
- 100 published papers which Josip had in 1987 was something very hard to ignore.
- Very soon he got his first PhD students. **Sanja Varošanec** was the first who defended her thesis under his supervision in 1994. And many followed. **35 until now.** REMARKABLE.

List of all PhD students (Josip's PhD children)

- 1. Sanja Varošaneć, 1994
- 2. Ilko Brnetić, 1997
- 3. Ivan Perić, 1997
- 4. Marko Matić, 1998
- 5. Vera Čuljak, 1999
- 6. Aleksandra Čizmešija, 1999
- 7. Rajko Roki, 2000
- 8. Vidosava Šimić, 2001
- 9. Jadranka Mićić Hot, 2001
- 10. Nenad Ujević, 2001
- 11. Ana Vukelić, 2003
- 12. Andrea Aglič Aljinović, 2004
- 13. Mario Krnić, 2004
- 14. Iva Franjić, 2006,
- 15. Željko Hanjš, 2006
- 16. Mirna Rodić Lipanović, 2008
- 17. Matloob Anwar, 2009
- 18. Sabir Houssain, 2009
- 19. Julije Jakšetić, 2010
- 20. Kristina Krulić, 2010
- 21. Atiq ur Rehman, 2011
- 22. Naveed Latif, 2011
- 23. Marjan Praljak, 2011
- 24. Ksenija Smoljak, 2011

List of all PhD students (Josip's PhD children)

- 25. Ghulam Farid, 2012
- 26. Muhammad Adil Khan, 2012
- 27. Jurica Perić, 2012
- 28. Khuram Ali Khan, 2013
- 29. Ghulam Roqia, 2013
- 30. Sajid Iqbal, 2013
- 31. Saad Ihsan Butt, 2014
- 32. Asif Raza Khan, 2014
- 33. Sadia Khalid, 2014
- 34. Asfand Fahaf, 2016
- 35. Rozarija Mikić, 2017

6. MIA journal

- Having so many published papers with so many international mathematicians it was natural for Josip to think about founding a Croatian international mathematical journal.
- In Josip's case it is very short path between an idea and its realization.
- The first journal he founded (in closed cooperation with **Neven Elezović**, a publisher and a mathematician, not his student but his most cited coauthor) was:

- Later, Josip published in the cooperation with other Croatian and international mathematicians 13 (until now) monographs, under the common name “Monographs in Inequalities”, from the field of inequalities with the 1st one in 2005.



7. Josip Pečarić-the Academician

- Josip was very proud when he was elected as a full member of Croatian Academy of Sciences and Art (HAZU) in 2000 at the age of 52. He still is very unconventional academician, and in some very conditional and Josip's way "much more militaristic than the norm" (John von Neuman for himself).
- There are only four full members of Croatian Academy of Sciences and Art (HAZU) from the field of mathematics. They are: **Goran Muić** (newly elected; representation theory of p-adic groups), **Andrej Dujella** (number theory), **Josip Pečarić** (real functions, theory of inequalities), **Marko Tadić** (representation theory of topological groups). Behind and over them is the painting of **bishop Josip Juraj Strossmayer**, the founder of HAZU.

Croatian Academicians, field of Mathematics

Goran Muić, Andrej Dujella, Josip Pečarić, Marko Tadić



8. The international cooperations

- Although numbers of papers and books produced by Josip are especially remarkable and extremely rare (and anybody can find these numbers on MathSciNet or WoS) it should be also emphasized his capability to cooperate with other mathematician and transfer his knowledge and expertise to younger mathematicians. He has, according to MathSciNet, **231 coauthors** throughout the world. REMARKABLE.
- He was the direct advisor to **35 PhD thesis** and probably at least 20 more would not have been finished without his help. REMARKABLE. This is something which cannot be overestimated. What can be of more value than introducing younger people in something so beautiful and inexhaustible such as theory of inequalities.

- In particular, Josip has been invited to several countries for longer or shorter research visits. For example, he was invited by me and my university at several occasions and this has resulted in 26 joint publications (so far) and one joint PhD student. The early cooperation with Josip was indeed very important for my own career.
- There are many similar examples where Josip has substantially influenced the research also in other countries. The maybe most important examples of such visits are Josip's Australia and Pakistan I shortly describe in my next two Sections.

- Finally, let me mention that there are examples of “cooperation” I know Josip appreciable very much even if they have not resulted in any paper. For example, his friendship with Professor **Zvonimir Janko**, retired from University of Heidelberg. Another great Croatian mathematician who is the eponym of the Janko groups, sporadic simple groups in group theory. Besides summer friendship, they share many things. Creativity in mathematics, love to teach younger mathematicians (especially in Croatia, where is desperately needed), but also a political views which are not, say at least, at the bottom of Josip’s priorities.



Zvonimir Janko, Josip Pečarić, two famous Croatian mathematicians

9. The Australian adventure

- Among many scientific travels and conferences probably the most important so far was Josip's visit to Australia for two years in 1992-1993.
- Among others there he started cooperation with Charles Pierce and Bertram Mond. The work with Mond was especially fruitful. The Mond-Pečarić method was born which resulted in probably more than hundred published papers on operators inequalities in notable international journals.

Mond, Proschan and Pečarić





Bertram Mond, Frank Proschan, Josip Pečarić, Melbourne, 1992

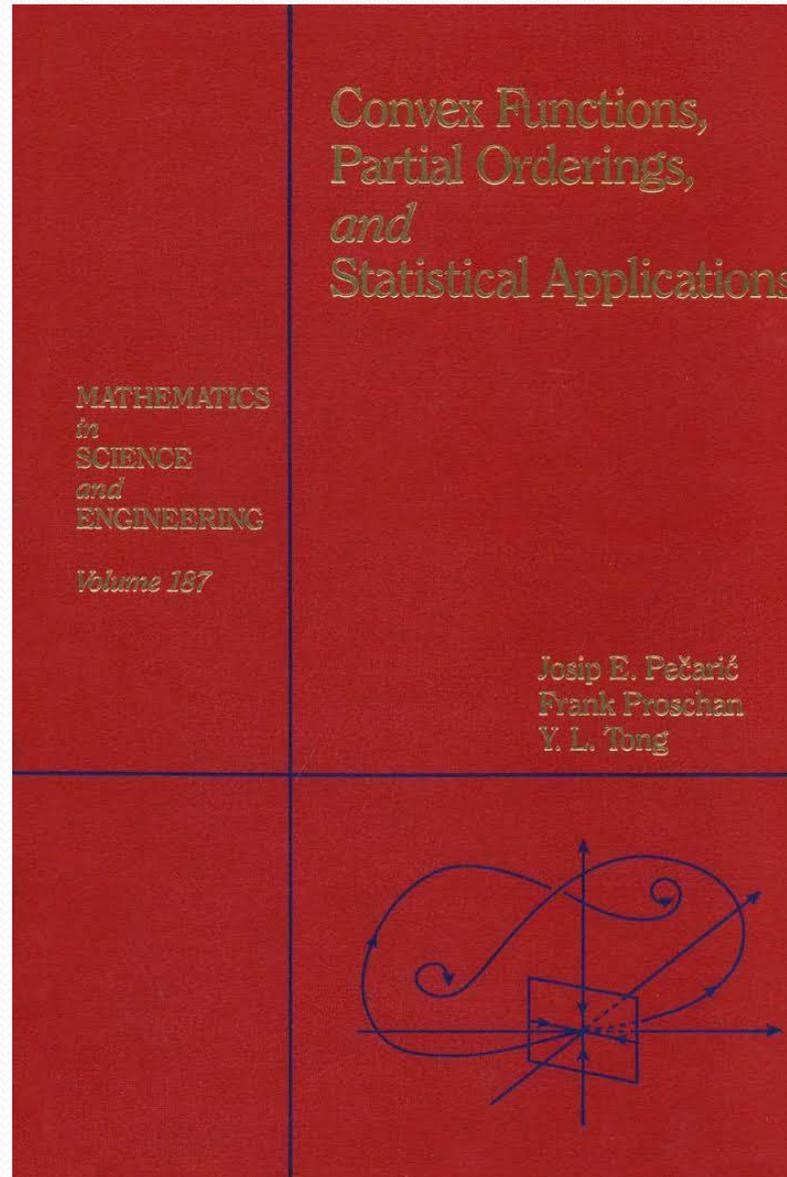
The famous “Red Book”

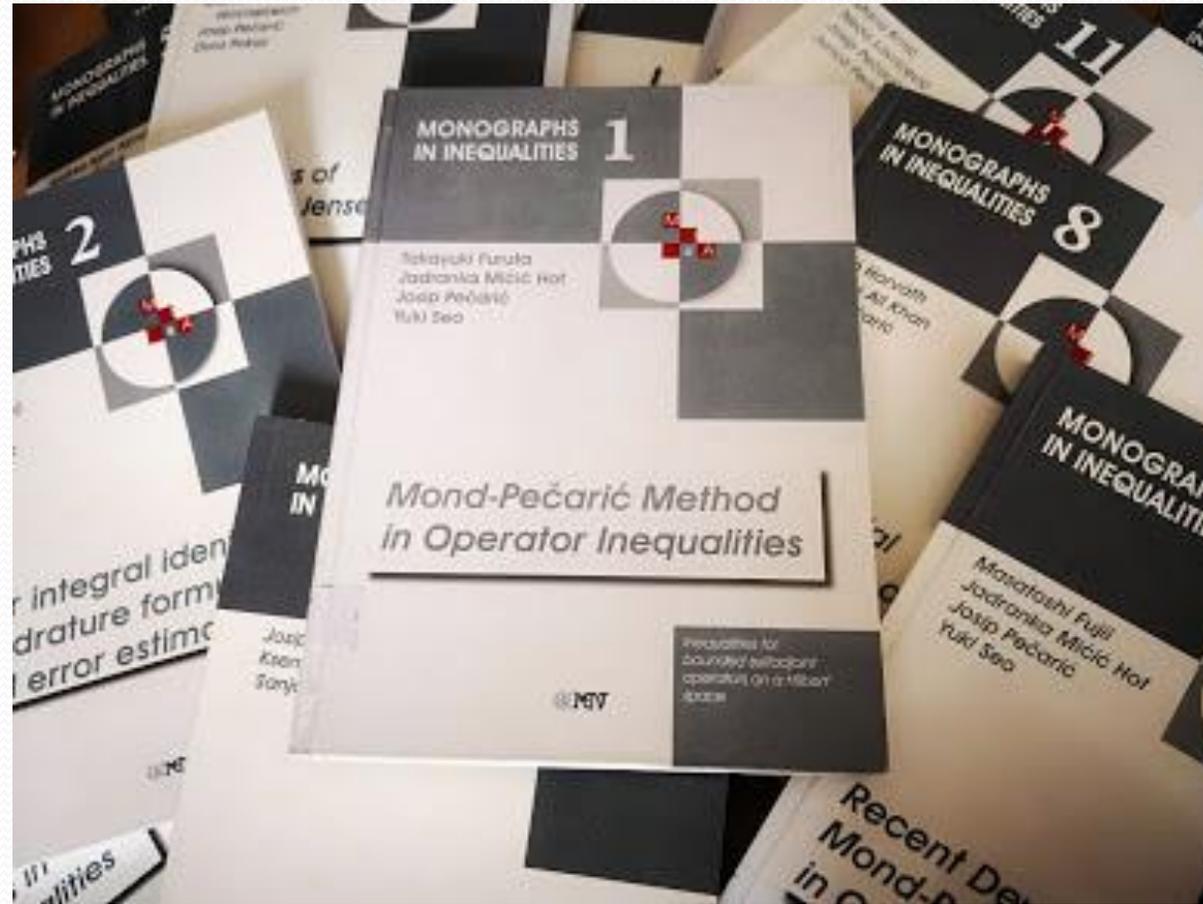
by

Josip E. Pečarić

Frank Proschan

Y. L. Tong





The first one from the series “Monographs in Inequalities”

10. The Pakistan adventure

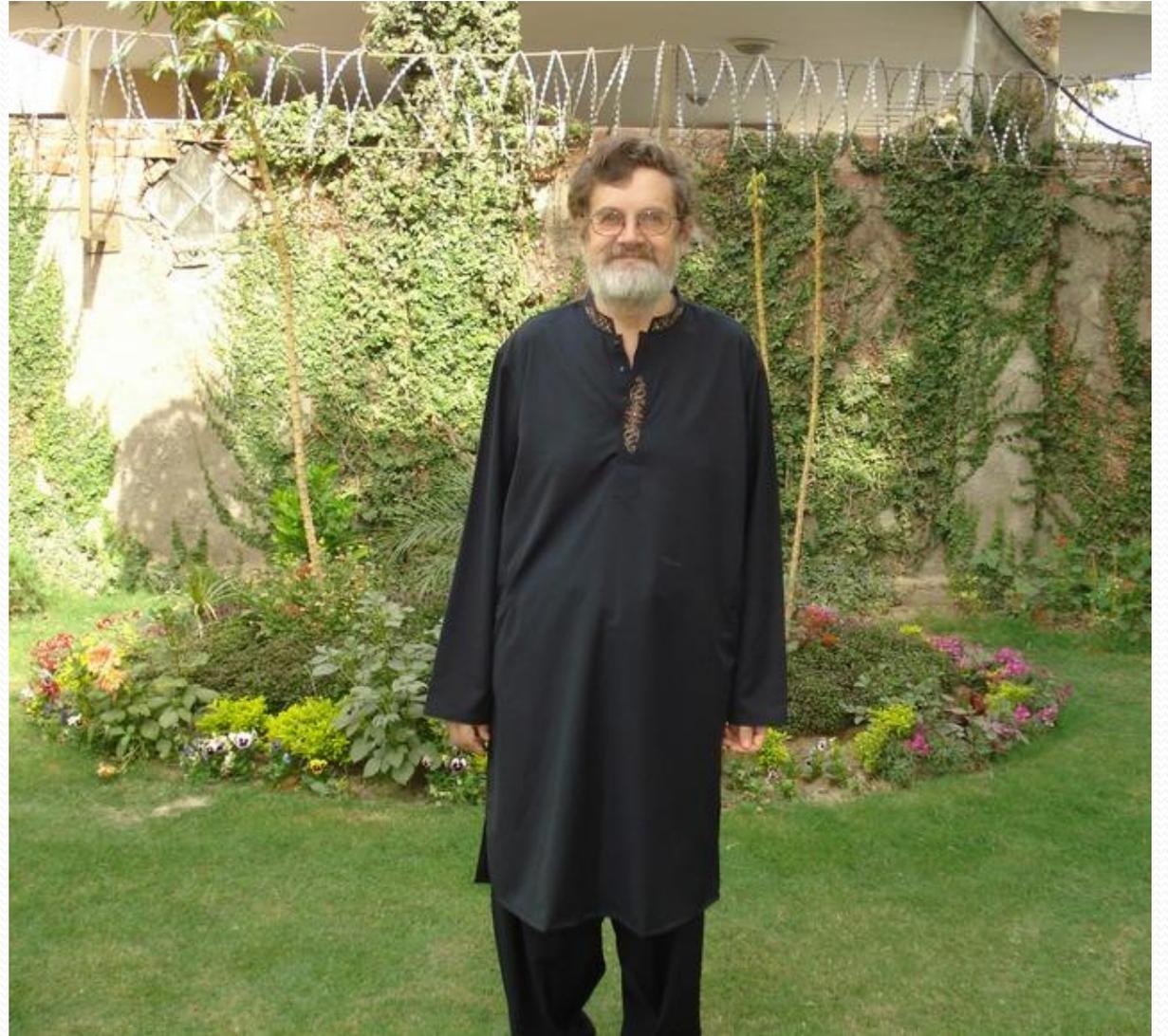
One international mathematical cooperation which was very dear to Josip was his visiting to Abdus Salam School of Mathematical Sciences (ASSMS), GC University, Lahore, Pakistan. He was invited by Prof. Dr. Alla Dita Raza Choudary, the Director General of the ASSMS. The ASSMS is a unique leading research center of mathematics that has been established in 2003 by the name of famous Pakistani Nobel Laureate of Physics Prof. Dr. Abdus Salam (the founder of ICTP, Trieste). It is a doctoral school in mathematics with no under-graduates. Its faculty is entirely foreign from all over the world (but mostly from Eastern Europe). There is an excellent article in Notices of AMS on ASSMS.

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- It is not easy to track all Josip's visits to ASSMS. According to available data he visited ASSMS from 2006-2014 every year at least for three months. His PhD students was very motivated and strictly selected. He was the advisor for 13 PhD thesis from 2009 to 2016 (REMARKABLE!) and published many papers with his students.
 - He left an indelible mark on Pakistani mathematics. Many of his students now have a permanent positions in Pakistani universities.



Lahore, Pakistan, MIA2010

- Traditional Pakistani suit



11. Concluding words

THANK YOU dear Josip for:

- all wonderful mathematical contributions
- creating the new country of inequalities
- for accepting us as members of this wonderful country
- all you have influenced the mathematical and political areas
- providing us with your fighting spirit of various kind
- all students you have supervised
- being my dear friend

Congratulations

with my best wishes
to my dear friend
Josip Pečarić on your
70th anniversary!



Thank you for your attention!



Yours Lars-Erik