

Jerzy K. Baksalary (1944–2005) and his contributions to *Image*

Oskar Maria Baksalary & George P. H. Styan

Professor Jerzy K. Baksalary passed away in Poznań, Poland, on 8 March 2005. He was 60 years old. Although suffering, he remained active in his research work to the very end.

Jerzy Baksalary was born in Poznań on 25 June 1944. He was awarded a Ph.D. degree in 1975 by the Adam Mickiewicz University, Poznań, for his dissertation written under the supervision of Tadeusz Caliński.



Photo by Simo Puntanen

At the funeral service for Jerzy Baksalary held in Poznań on 15 March 2005, Tadeusz Caliński eulogized him (in Polish):

“Let me express our feelings particularly on behalf of those who were close to you in the early years of your academic career, in the seventies and eighties of the past century, at the Agricultural University of Poznań. At that time you were for us an encouraging example of a person full of scientific ideas and willing to work hard. Your works in the theory and application of mathematical statistics and linear algebra drew us into the streams of worldwide scientific literature.

Your personality stimulated younger colleagues and students, for whom you soon became a master and promoter of their careers. Among our joint scientific results of those years, your achievements shine with a particular brilliance. Your contributions to the Poznań school of mathematical statistics and biometry are highly esteemed at present and will be acknowledged by future generations.”

For the years 1969–1988, Jerzy Baksalary was associated with the Department of Mathematical and Statistical Methods in the Agricultural University of Poznań, and he joined the academic community in Zielona Góra in 1988, first working in the Department of Mathematics of the Tadeusz Kotarbiński Pedagogical University and then in the Institute of Mathematics of the University of Zielona Góra, after it was founded in 2001. He was Rector of the Tadeusz Kotarbiński Pedagogical University from 1990 to 1996 and then Dean of its Faculty of Mathematics, Physics, and Technology from 1996 to 1999.

Jerzy Baksalary published extensively on matrix methods for statistics. He is the author or coauthor of 170 published research publications in linear algebra and statistics, including 45 papers published in *Linear Algebra and its Applications* (LAA). The

Third Special Issue on Linear Algebra and Statistics of LAA (vol. 176, November 1992) was edited by Jerzy K. Baksalary and George P. H. Styan.

A Special Memorial Session for Jerzy Baksalary was organized by Oskar Maria Baksalary, Simo Puntanen, George P. H. Styan, and Götz Trenkler at the 14th International Workshop on Matrices and Statistics (Auckland, New Zealand, 29 March–1 April 2005). For this Memorial Session, Oskar Baksalary wrote about his father:

“Although from the formal point of view I am a physicist and not a mathematician or statistician, with the death of JKB I have lost not only my father, but also my scientific master. On the one hand, this makes his passing away twice as hard for me to bear, but on the other hand I am very happy that for about the last four years I have been sharing with my father his great passion – mathematics. During this period we have been spending lots of time together, for instance travelling, visiting jazz clubs and art galleries, attending Thursday seminars on linear algebra organized at the Agricultural University of Poznań, chatting, and first of all . . . doing mathematics.

JKB really loved his subject and especially he was in love with everything having to do with matrices. This means he also loved the International Workshops on Matrices and Statistics. My father and I have been participating in these Workshops since 2000, when the Workshop was held in Hyderabad, India, and thus the one organized this year in Auckland was to be the sixth which we would jointly attend.”

The First Southern Ontario Matrices and Statistics Days, to be held in Windsor, Ontario, Canada, 9–10 June 2005, will be dedicated to Jerzy K. Baksalary. In preparation for distribution there is a handout, which will include a complete publication list¹ plus comments on the life and work of Jerzy K. Baksalary by Oskar Maria Baksalary, Tadeusz Caliński, R. William Farebrother, Jürgen Groß, Jan Hauke, Erkki Liski, Augustyn Markiewicz, Friedrich Pukelsheim, Tarmo Pukkila, Tomasz Szulc, Yongge Tian, Júlia Volaufová, Haruo Yanai, and Fuzhen Zhang. As Thomas Szulc points out there, Jerzy Baksalary was an extremely active contributor to the *Image* Problem Corner:

¹Building on the list prepared for the “Session on the occasion of the 60th birthday of Jerzy K. Baksalary” held at the Mathematical Research & Conference Center, Polish Academy of Sciences, Bgdlewo, Poland, on 17 August 2004, just before the 13th International Workshop on Matrices and Statistics.

"I was deeply saddened to learn that Jerzy Baksalary has passed away. For the very last time we saw each other in mid-February at the seminar held at the Agricultural University of Poznań. This was a meeting in a series of seminars organized since 1999 every second Thursday. Participants of these seminars were: Jerzy K. Baksalary, Oskar Maria Baksalary, Jan Hauke, Augustyn Markiewicz, Tomasz Szulc and a group of Ph. D. students – our group was called by Jerzy: PLAG, an acronym for the Poznań Linear Algebra Group. Our meetings were instructive and fruitful and without any doubt, this was mainly due to Jerzy.

The activities of PLAG are well reflected in the problems and solutions in subsequent *Image* Problem Corners, for the problems posed therein were extensively discussed and analyzed during our seminars. The fruit of the cooperation between Jerzy and myself within PLAG meetings resulted in two joint papers published in *Linear Algebra and its Applications*. With the death of Professor Jerzy K. Baksalary, the linear algebra community has lost a truly great specialist in matrix analysis and PLAG has lost its leader."

Jerzy Baksalary's contributions to the *Image* Problem Corner include the following, listed here in order of publication:

1. Jerzy K. Baksalary, Oskar Maria Baksalary (2001). Solution 25-1.1 (to Problem 25-1: "Moore–Penrose inverse of a skew-symmetric matrix" proposed by Jürgen Groß, Sven-Oliver Troschke, Götz Trenkler). *Image* 26, 2.
2. Jerzy K. Baksalary, Oskar Maria Baksalary (2001). Solution 25-4.1 (to Problem 25-4: "Two rank equalities associated with blocks of an orthogonal projector" proposed by Yongge Tian). *Image* 26, 6–7.
3. Jerzy K. Baksalary, Oskar Maria Baksalary (2001). Solution 25-5.1 (to Problem 25-5: "Three inequalities involving Moore–Penrose inverses" proposed by Yongge Tian). *Image* 26, 9–10.
4. Jerzy K. Baksalary, Oskar Maria Baksalary (2001). Solution 25-6.1 (to Problem 25-6: "Generalized inverse of a matrix product" proposed by Yongge Tian). *Image* 26, 10–11.
5. Jerzy K. Baksalary, Oskar Maria Baksalary (2001). Solution 26-4.1 (to Problem 26-4: "Commutativity of EP matrices" proposed by Yongge Tian). *Image* 27, 30.
6. Jerzy K. Baksalary, Oskar Maria Baksalary (2001). Solution 26-5.1 (to Problem 26-5: "Convex matrix inequalities" proposed by Bao-Xue Zhang). *Image* 27, 33–34.
7. Jerzy K. Baksalary, Richard William Farebrother (2002). Solution 27-1.1 (to Problem 27-1: "A class of square roots of involutory matrices" proposed by Richard William Farebrother). *Image* 28, 26–28.
8. Jerzy K. Baksalary, Oskar Maria Baksalary (2002). Solution 27-2.1 (to Problem 27-2: "Specific generalized inverses" proposed by Jürgen Groß, Götz Trenkler). *Image* 28, 29.
9. Jerzy K. Baksalary, Jan Hauke (2002). Solution 27-6.1 (to Problem 27-6: "Inequalities of Hadamard products of nonnegative definite matrices" proposed by Xingzhi Zhan). *Image* 28, 33.
10. Jerzy K. Baksalary, Oskar Maria Baksalary (2002). Solution 28-5.1 (to Problem 28-5: "A range equality for Moore–Penrose inverses" proposed by Yongge Tian). *Image* 29, 28–29.
11. Jerzy K. Baksalary (2002). Solution 28-6.1 (to Problem 28-6: "Square roots and additivity" proposed by Dietrich Trenkler, Götz Trenkler). *Image* 29, 30.
12. Jerzy K. Baksalary, Oskar Maria Baksalary (2002). Solution 28-7.2 (to Problem 28-7: "Partial isometry and idempotent matrices" proposed by Götz Trenkler). *Image* 29, 31.
13. Jerzy K. Baksalary, Jan Hauke (2002). Solution 28-10.1 (to Problem 28-10: "Inequalities involving square roots" proposed by Fuzhen Zhang). *Image* 29, 33–34.
14. Jerzy K. Baksalary, Oskar Maria Baksalary (2002). Problem 29.1: "A condition for an EP matrix to be Hermitian". *Image* 29, 36.
15. William F. Trench, Jerzy K. Baksalary, Oskar Maria Baksalary (2003). Solution 29-1.2 (to Problem 29-1: "A condition for an EP matrix to be Hermitian" proposed by Jerzy K. Baksalary, Oskar Maria Baksalary [14]). *Image* 30, 22.
16. Jerzy K. Baksalary, Oskar Maria Baksalary (2003). Solution 29-5.1 (to Problem 29-5: "Product of two Hermitian nonnegative definite matrices" proposed by Jürgen Groß, Götz Trenkler). *Image* 30, 24–25.
17. Jerzy K. Baksalary, Roger A. Horn (2003). Solution 29-7.1 (to Problem 29-7: "Complementary principal submatrices and their eigenvalues" proposed by Chi-Kwong Li). *Image* 30, 26–27.
18. Jerzy K. Baksalary, Xiaoji Liu (2003). Solution 29-8.1 (to Problem 29-8: "A range equality involving an idempotent matrix" proposed by Yongge Tian). *Image* 30, 27.
19. Jerzy K. Baksalary, Jan Hauke (2003). Solution 29-9.1 (to Problem 29-9: "Equality of two nonnegative definite matrices" proposed by Yongge Tian). *Image* 30, 29–30.
20. Jerzy K. Baksalary (2003). Solution 29-10.1 (to Problem 29-10: "Equivalence of three reverse-order laws" proposed by Yongge Tian). *Image* 30, 31.
21. Jerzy K. Baksalary, Oskar Maria Baksalary, Xiaoji Liu (2003). Problem 30-1: "Star partial ordering, left-star partial ordering, and commutativity". *Image* 30, 36.
22. Jerzy K. Baksalary, Oskar Maria Baksalary, Xiaoji Liu (2003). Solution 30-1.1 (to Problem 30-1: "Star partial ordering, left-star partial ordering, and commutativity" proposed by Jerzy K. Baksalary, Oskar Maria Baksalary, Xiaoji Liu [21]). *Image* 31, 30–31.
23. Jerzy K. Baksalary, Oskar Maria Baksalary (2003). Solution 30-5.1 (to Problem 30-5: "A range equality for the difference or orthogonal projectors" proposed by Yongge Tian). *Image* 31, 36–37.
24. Jerzy K. Baksalary, Oskar Maria Baksalary (2003). Solution 30-6.1 (to Problem 30-6: "A matrix related to an idempotent matrix" proposed by Götz Trenkler). *Image* 31, 39.
25. Jerzy K. Baksalary, Oskar Maria Baksalary (2003). Solution 30-7.1 (to Problem 30-7: "A condition for an idempotent matrix to be Hermitian" proposed by Götz Trenkler). *Image* 31, 41.
26. Jerzy K. Baksalary, Oskar Maria Baksalary, Xiaoji Liu (2004). Solution 31-2.1 (to Problem 31-2: "Matrices commuting with all nilpotent matrices" proposed by Henry Ricardo). *Image* 32, 21–22.
27. Jerzy K. Baksalary (2004). Solution 31-3.1 (to Problem 31-3: "A range equality for block matrices" proposed by Yongge Tian). *Image* 32, 23–24.
28. Jerzy K. Baksalary, Paulina Kik, Augustyn Markiewicz (2004). Solution 31-6.1 (to Problem 31-6: "A full rank factorization of a skew-symmetric matrix" proposed by Götz Trenkler). *Image* 32, 27–28.
29. Jerzy K. Baksalary, Oskar Maria Baksalary (2004). Solution 31-7.1 (to Problem 31-7: "On the product of orthogonal projectors" proposed by Götz Trenkler). *Image* 32, 30–31.
30. Jerzy K. Baksalary, Anna Kuba (2004). Solution 31-7.2 (to Problem 31-7: "On the product of orthogonal projectors" proposed by Götz Trenkler). *Image* 32, 31–34.