

**ON JERZY BAKSALARY'S
CONTRIBUTION TO NUMERICAL METHODS**

ANITA DOBEK

Department of Mathematical and Statistical Methods
University of Life Sciences
Wojska Polskiego 28, PL-60637, Poznań, Poland

My cooperation with Jerzy K. Baksalary and Radosław Kala started in the earliest of seventieth. At that time Jerzy was still working at the Didactic Unit of Mathematics belonging to the Institute of Mathematics, Physics and Chemistry, and I was already working at the Department of Mathematical and Statistical Methods. However, Jerzy from the very beginning was very active at the seminars organized by our Department and joined us in our scientific work.

In the years 1971–1980 the scientific activity of the members of our Department concentrated mainly on a research connected with a project sponsored by the Institute of Mathematics of the Polish Academy of Sciences. Two subjects were realized in this project:

- the methods of multivariate analyses and their application in agriculture and biology,

and

- construction of biometric and statistical algorithms.

Later on, inspired by the interests of Jerzy and Radosław Kala, a third subject was added and that was

- linear models and their applications in the theory of experiments

continued by

- statistical inference in linear models.

It should be noted, that at that time the computer center created in 1972 at our Department, was the only one at the Agricultural University of Poznań. We were supposed to do research but also to consult statistical problems and to do the computations for all the scientists from the University. The available software was extremely poor. So, it was natural that in our occupation we consecrate quite a lot of time trying to adopt the known methods as well as our theoretical results to computational purposes by constructing the biometric and statistical algorithms. The commonly used language at that time was ALGOL.

From the very beginning the scientific interests of Jerzy Baksalary were focused on the theory of matrices. The first two algorithms, prepared together with Radosław Kala, were:

- the determination of the basis of a matrix [1] and
- procedure for calculating a generalized inverse of any matrix [2].

When I joined the team we were continuing the research on several numerical aspects of matrix algebra, especially concerning the different types of projectors [3],[10]. The algorithms used in the corresponding procedures referred to:

- computation of orthogonal projectors [4],
- computation of projectors [5],
- rank factorization of a real matrix [6].

As I mentioned before, apart of the theoretical works, all the members of the Department were (and still are) supposed to consult the researchers from different domains. Stimulated by this contacts and trying to resolve real problems Jerzy with coworkers wrote a program for the analysis of variance for cross classifications by the Bock's method [7]. Afterwords, together with Radosław Kala we wrote two programs. The first one provided a statistical analysis in a general linear model [8] and the second was realizing the analysis of growth curves [9].

The described ALGOL programs were quite often used for a long time. Then the professional statistical packages, used long before in occident, appeared in our country and the interest in construction of new procedures significantly decreased. Jerzy stopped working on algorithm and focused his scientific interest on the theory of matrices.

REFERENCES

- [1] J. Baksalary and R. Kala, *Wyznaczanie bazy macierzy*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **64** (2) (1973), 3–9.
- [2] J. Baksalary and R. Kala, *Procedura obliczania uogólnionej odwrotności macierzy*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **71** (3) (1974), 157–165.
- [3] J.K. Baksalary, A. Dobek and R. Kala, *A method for computing projectors*, Zhurnal Vychislitel'noi Matematicheskoi Fiziki **16** (1976), 1038–1040.
- [4] J.K. Baksalary, A. Dobek and R. Kala, *Wyznaczanie operatorów rzutowania ortogonalnego*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **86** (5) (1976), 187–194.
- [5] J.K. Baksalary, A. Dobek and R. Kala, *Wyznaczanie operatorów rzutowania*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **95** (6) (1977), 175–83.
- [6] J.K. Baksalary, A. Dobek and R. Kala, *Rozkład macierzy rzeczywistej na czynniki pełnych rzędów*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **106** (7) (1978), 179–183.
- [7] J.K. Baksalary, R. Kala and K. Katulska, *Analiza wariancji dla klasyfikacji krzyżowych metodą Bocka*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **95** (6) (1977), 3–32.
- [8] J.K. Baksalary, A. Dobek and R. Kala, *Analiza statystyczna w ogólnym modelu liniowym*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **106** (7) (1978), 3–23.
- [9] J.K. Baksalary, A. Dobek and R. Kala, *Estymacja krzywych wzrostu*, Roczniki Akademii Rolniczej w Poznaniu, Algorytmy Biometryczne i Statystyczne **106** (7) (1978), 81–113.
- [10] J.K. Baksalary, A. Dobek and R. Kala, *Calculation of projections*, Zastosowania Matematyki **17** (1980), 209–215.

Received 14 December 2007