

## On the sixtieth birthday of Professor dr. Gheorghe Micula

Dumitru Acu

Professor dr. Gheorghe Micula has made fundamental contributions in many central parts of numerical analysis. He is a mathematician whose work possessed power, grace, and beauty; it has continuing relevance in numerical solution of differential, integral and partial differential equations and spline functions and their applications.

Gheorghe Micula has a grace and charm that convinced rather than bludgeoned. His linguistic skills - he speaks fluent in at least five languages - and his sense of humor enhanced his ability to present his ideas.

His humor was often self-effacing: it was delivered with the confidence that captured the attention and affection of his audience.

Gheorghe Micula was born on April 23, 1943, in the village Delureni, Bihor County, Romania, in a farmer's family. After finishing secondary school in Vadul Crişului, in 1960, he studied at the Faculty of Mathematics and Physics, University of Cluj-Napoca. He received a master's degree in Mathematics and Physics in 1965, with "Best" qualification (*Magna cum laude*).

In the same year he was named assistant-professor at the Department of Differential Equations, University of Cluj.

In 1971 he obtained the degree of Doctor of Mathematics (Ph. D.) at the University of Cluj. His thesis, entitled “*Contribution to the Numerical Solutions of Differential Equations by Spline Functions*”, was written under the direction of the professor Dumitru V. Ionescu. Between 1975 and 2003 he worked at the University of Cluj, where, in a normal succession, he advanced up to the rank of full professor at the Chair of Differential Equations.

He got married in 1965. His wife, professor dr. Maria Micula (born Vasile), works also as a mathematician at the Agricultural Sciences and Veterinary Medicine Faculty of University of Cluj- Napoca. They have a daughter Sanda (born 1968), who works also as a mathematician professor in U.S.A.

He held visiting positions at the Weizmann Institute of Sciences (Rehovot Israel), University of Dalian (China), University of Trieste (Italy), University of Auckland (New Zealand), Akdeniz University Antalya (Turkey), University of Heidelberg (Germany), University of Stuttgart (Germany), Universite de Metz (France), Universität Hamburg (Germany), Università Degli Studi di Roma “La Sapienza” (Italy), Politecnico di Milano (Italy), and Universität Bremen (Germany).

He had fellowships from the University of Freiburg (Alexander von Humboldt - West Germany) and University of Kentucky Lexington (Fullbright Fellow - U.S.A.).

He was invited at the varied universities to deliver lectures and to present communications in the field of numerical solution of differential and inte-

gral equations by spline functions. Among them we mention: Bochüm, Darmstadt, Karlsruhe, Aachen, Göttingen, Oberwolfach, Siegen, Hamburg, Berlin, Freiburg, Heidelberg, Mainz, Mannheim, Evlagen, Stuttgart, Würzburg, Augsburg (Germany): Torino, Milano (Italy): Tel Aviv, Haifa (Israel); Dublin (Ireland); Chişinău (Moldavia); Prague (Czech); Budapest (Hungary); Helsinki (Finland): Teajon (South Korea): Antalya (Turkey); Barcelona (Spain): Zürich (Switzerland) and Beijing (China).

In 1973 Gheorghe Micula was awarded the "First Prize in Mathematics" by the Balkan Union of Mathematics, in Athenes and in 1980 he was awarded "Prize I" of the Romanian Academy of Sciences for the book entitled "Spline Functions and Applications" (Technical Publishing House, Bucharest 1978, 336 pp.).

Professor Gheorghe Micula has participated as invited speaker at: International Conference on "Functional Differential Equations and Applications", Akdeniz University Antalya, Turkey (1977, July); the 3rd European Congress of Mathematics, Barcelona, Spain (2000, July 10 - 14): the International Colloquium on the Application of Mathematics, in Memoriam "Luthar Colatz", Hamburg, Germany (2000, September 28 - 30); the First Conference of the Mathematical Society of Moldova, Chişinău (2001, August 15 - 20) and the GAMM Tagung, 2002, University of Augsburg, Germany (2002, march 24- 30).

As invited Chairman he has participated in many events: the International Conference on Multifield Problems, University of Stuttgart, Germany (2002, April 7 - 12); the Workshop "Giornati di Studio su Fuzioni Spline e Fuzioni Radiali: Applicazioni a Problemi Integrali e Differenziali", Uni-

versita degli Studi di Torino, Italy (2003, February 5 - 15); the Convegno Annuale GNCS 2003: “*Calcolo Scientifico, Modelli e Metodi Numerici Innovativi*”, Politecnico di Milano, Italia (2003, February 15 - 20).

His publication list contains about 91 items (7 books and 84 original papers).

The main contributions in research work of Gheorghe Micula fall into the following list of topics: Numerical Solutions of Differential, Integral and Partial Differential Equations Spline Functions and Their Applications, Numerical Analysis and the Theory of Approximation. The results obtained by Gheorghe Micula in these topics have been maintained and used on the important papers and books published by J. Böhmer, J. Butcher, J. N. Subbotin, W. Schempp, G. Meinaidars, H. Brunner, N. H. Mülthei, G. Hömerlin, Ju. S. Zavjalov, G. Nürnberger, J. W. Schmidt, W. Haussmann, B. D. Bojanov, K. E. Atkinson, J. Cyörtvery, B. Kaasov etc.

Since 1972 he has been a member of the Romanian Mathematical Society. For several years he was the president of this Society, Filiala Cluj-Napoca (1995 - 2003). He is also a member of the societies: “Gesellschaft für Angewandte Mathematik and Mechanik” (Germany - 1974), “American Mathematical Society” (U.S.A. - 1978), “European Mechanics Society” (1994) and “European Mathematical Society” (U.S.A. - 1989).

For many years he has been a reviewer of the journals: “Mathematical Reviews” (U.S.A.) and “Zentralblatt für Mathematik” (Germany).

He is member of several editorial committees of mathematical journals: *Studia Univ. Babeş-Bolyai Informatica*, *Bulletin Mathématique de la Société des Sciences Mathématiques de Roumanie*, *Buletinul Şt. Univ.*

Baia Mare and Seminar on Fixed Point Theory.

Since 1993 he has been advisor for the doctoral dissertation in the topics “Differential and Partial Equations”.

In May 2003 University of Oradea has awarded him the scientific title of Doctor Honoris Causa.

Professor Gheorghe Micula exerts a profound influence on many of his students. Micula's courses are irresistible. He gives his own ideas generously to his students.

Gheorghe Micula has a warm and sensitive personality. His door is always open to his friends. He enjoys discussions, often provocative ones, about mathematics, poetry, art and music.

He is himself “un homme libre”, free of all influences, and wants others to be the same.

## **List of Mathematical Publications of Professor dr. Gheorghe Micula**

- [1] *O formulă de cuadratură cu cinci noduri cu gradul de exactitate cinci.* Studia Univ. Babeş - Bolyai , Cluj, Series Math. Fasc. 2, (1967), 58-74.
- [2] *Sur la formule de quadrature de Tricomi.* Bull. Math. S Sci. Math. de Roumanie, 12 (1968), 95-105. (joint paper with M. Micula)
- [3] *Optimal cubature formulas for certain classes of functions.* Anal. Şt. Univ. Al. I. Cuza, Iaşi, 16 (1970), 345-356. (joint paper with G. Coman)
- [4] *Optimal cubature formulae.* Rendiconti di Mathematica, 4 (1971), Nr. 6, 303-311.

- [5] *Approximate integration of systems of differential equations by spline functions.* Studia Univ. Babeş - Bolyai, Cluj, Series Math. Fasc. 2 (1971), 27-39.
- [6] *Fonctions spline d'approximation pour les solutions des systèmes dequations différentielles.* Anal. St. Univ. Al. I. Cuza, Iaşi 27 (1971), 139-155.
- [7] *Contributions to the numerical solution of differential equations by spline functions.* (roumanian). Doctoral dissertation, Univ. of Cluj, Romania, 1971.
- [8] *Spline functions approximating the solution of nonlinear differential equation of  $n$  - th order.* ZAMM, 52 (1972), 189-190.
- [9] *Funcții spline de grad superior de aproximare a soluțiilor sistemelor de ecuații diferențiale.* Studia Univ. Babeş - Bolyai Cluj, Fasc. 1 (1972), 21-32.
- [10] *Numerical integration of differential equation  $y^{(n)} = f(x, y)$  by spline functions.* Rev. Roum. Math. Pures et Appl. (Bucharest), 1 (1972), 1385-1390.
- [11] *Approximate solution of the differential equation  $y'' = f(x, y)$  with spline functions.* Math. Comput. 27 (1973), 807-816.
- [12] *Sur la résolution numérique des équation integrale du type de Volterra de seconde espèce à l'aide des fonction spline.* Studia Univ. Babeş - Bolyai Cluj, Series Mathematica, Fasc. 2 (1973), 65-68. (joint paper with M. Micula)
- [13] *Die numerische Lösung nichtlinearer Differentialgleichungen unter Verwendung von Spline - Funktionen.* Lect. Notes in Math. 395, Springer, 1974, 57-83.

- [14] *Deficient spline approximate solutions to linear differential equations of the second order.* Mathematica (Cluj), 16 (39) (1974), 65-72.
- [15] *The numerical solution of Volterra integro - differential equations by spline functions.* Rev. Roum. Math. Pures et Appl. (Bucharest), 20 (1975), 349-358.
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- [17] *The numerical solution of nonlinear differential equations by deficient spline functions.* ZAMM, 55 (1975), 254-255.
- [18] *Bemerkungen zur numerischen Lösung von Anfangeswertproblemen mit Hilfe nichtlinearer Spline - Funktionen.* Lect. Notes in Math. 501 (1975), 200-209. Springer, 1975.
- [19] *On the approximative solution of nonlinear differential equations of the second order by deficient spline functions.* Lucrări Științifice, Seria A, Inst. Ped. Oradea, (Romania), (1975), 7-11.
- [20] *Bemerkungen zur numerischen Behandlung von nichtlinearer Volterraschen Integralgleichungen mit Splines.* ZAMM, 56 (1976), 302-304.
- [21] *Teoria funcțiilor spline și aplicații. Bibliografie.* Litografia Fac. de Matematică, Univ. Babeș - Bolyai, Cluj - Napoca, 1978, 104 p.
- [22] *Spline Functions and Applications* (romanian). Bucharest Technical Publishing House, 1978, 348 pp. (Book distinguished with "The first Prize of the Romanian Academy of Science", Bucharest 1980).
- [23] *Numerische Behandlung der Volterra - Integralgleichungen mit Splines.* Studia Univ. Babeș - Bolyai, Cluj - Napoca, 24 (1979), Fasc. 2, 46-54.

- [24] *Teoria funcțiilor spline și aplicații*. Litografia Univ.Cluj-Napoca, 1979, 136 p.
- [25] *Asupra unor metode de rezolvare aproximativă a ecuațiilor diferențiale*. Lucrări Sem. Itinerant de Ec. Funcț., Aproximare și Convexitate, Cluj-Napoca, 17-19 mai 1979, 99-105.
- [26] *Projection method for the numerical solution of Hammerstein equations*. Proc. Seminar of Functional Eqs., Approximation and Convexity, Timișoara (Romania), 7 - 8 nov. 1980, 137-143.
- [27] *Culegere de Probleme și Exerciții de Ecuații Diferențiale și Integrale*, Litografia Univ. Babeș-Bolyai, Cluj-Napoca, 1980. (joint book with M. Frenkel, P. Pavel, B. Ionescu)
- [28] *Profesorul emerit D.V.IONESCU la împlinirea vârstei de 80 de ani*. Gazeta Matematică, Bucharest, vol.86, Nr.6, 1981, 225-226.
- [29] *The "D.V. Ionescu method" of constructing approximation formulas*. Studia Univ. Babeș - Bolyai, Cluj - Napoca, Mathematica, 26 (1981), No 2, 5-13.
- [30] *On "D.V. Ionescu method" in numerical analysis as a constructing method of spline functions*. Revue Roumaine de Math. Pures et Appl. 24 (1981), No 408, 1131-1141.
- [31] *Probleme de ecuații diferențiale și cu derivate parțiale*, Editura Didactică și Pedagogică, București, 1982. (joint book with I. A. Rus, P. Pavel, B. Ionescu)
- [32] *Numerische Behandlung von Differentialgleichungen mit modifizierten Argument mit Spline - Funktionen*. Proceedings of Colloq. Approx. and Optimization. Cluj - Napoca (Romania), October 25 - 27, 1984, 111-128.



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- [35] *The spline technique in the theory of differential equations*. Proceedings of the Conference on Differential Equations. Cluj - Napoca, November 21 - 23, 1985, 29 p.
- [36] *Numerical solution of some linear elliptic problems by spline functions*. Proc. Itinerant Seminar on Functional Equations, Approximation and Convexity. Iași, (Romania), 26 Oct. 1986, 13-17.
- [37] *Spline - Funktionen und Anwendungen*. Literaturverzeichnis. Preprint Nr. 1071, Juli 1987. Technische Hochschule Darmstadt, B.R.D. 219 p.
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- [39] *A polynomial spline approximation method for solving system of ordinary differential equations*. Studia Univ. Babeş - Bolyai, Mathematica, 4 (1987), 66-60. (joint paper with T. Fawzy and Z. Ramadan)
- [40] *Approximate solution of the second order differential equations with deviating argument by spline functions*. Mathematica - Revue d'Analyse Numérique et de Théorie de l'Approximation, Cluj-Napoca, Tome 30 (53), No 1, (1988), 37-46 (joint paper with H. Akça)

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- [45] *Differential Equations and Integral Equations by Practical Exercises and Problems* (romanian). Dacia Publishing House Cluj-Napoca, Romania, 1989, 290 p. (joint book with P. Pavel)
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Department of Mathematics

"Lucian Blaga" University of Sibiu

Str. Dr. I. Raţiu, nr. 5-7

550012 Sibiu, Romania.

E-mail address: *depmath@ulbsibiu.ro*