STUDIA UNIV. "BABEŞ–BOLYAI", MATHEMATICA, Volume **LII**, Number 2, June 2007

PROFESSOR GRIGORE CĂLUGĂREANU AT HIS 60TH ANNIVERSARY

SIMION BREAZ AND COSMIN PELEA

Grigore Călugăreanu was born on the 20th of January 1947, in Cluj-Napoca, in a family with strong academic traditions and important influences on the scientific life, as both his father and grandfather were members of the Romanian Academy of Sciences. He graduated from high-school in 1964 and the same year he became a student at the Faculty of Mathematics and Mechanics of the "Babeş-Bolyai" University in Cluj-Napoca. In 1969 he graduated with a dissertation on "Embedding Theorems in Categories" and he began to work at the Department of Algebra of the same university, first as Probation Assistant (September 1969–September 1970), then as Assistant (September 1970–March 1978). In 1977, he defended his Ph.D. thesis "Contributions to the theory of enriched modules and to the problem of endomorphisms" under the supervision of Professor Ionel Bucur and Professor Alexandru Solianu from the Faculty of Mathematics of the University of Bucharest. From March 1978 until March 1990 he was Lecturer and in 1990 he became Associate Professor in the Department of Algebra of the "Babeş-Bolyai" University.

It is in that period that we first met Professor Grigore Călugăreanu as students in an introductory course in Algebra. This meeting was undoubtedly one of the most important events in our students life and it convinced us to attend an Algebra course whenever this was possible. Later, we had the opportunity to meet Professor Călugăreanu again at an optional undergraduate course on the connections between Lattice Theory and Abelian Group Theory and at a graduate level course on Abelian Group Theory. As a matter of fact, these two topics are the core of Grigore Călugăreanu's research. From February 1998, Grigore Călugăreanu is Professor at

"Babeş-Bolyai" University, and from 2001, he is also Associate Professor at the Department of Mathematics and Computer Science of the Faculty of Science of Kuwait University.

Grigore Călugăreanu had an important influence on the mathematical activity in Cluj-Napoca (and not only). He obtained many valuable and interesting results concerning Abelian groups and lattices, results published in more that 40 research papers concerning the structure of an abelian group in connection with some objects attached to it, such as the endomorphism ring or the subgroup lattice. We mention the results concerning the structure of some generalizations of extending abelian groups, obtained in collaboration with L. Fuchs, who can be considered the "father" of Abelian Group Theory. We also mention a characterization for abelian groups with semilocal endomorphism ring, a characterization of n-root property using subgroup lattices, and the results on the structure of abelian groups with continuous subgroup lattice (in collaboration with K. Benabdallah), and the structure of abelian groups with breaking point subgroup lattice (in collaboration with M. Deaconescu and S. Breaz). Along the time, Professor Călugăreanu's communication abilities lead to numerous cooperations which are not confined to the field of mathematics. Thus, we can complete the list of collaborators by adding G. Birkenmeier, B. Charles, P. Goeters, P. Hamburg, R. Khazal, V. Leoreanu, C. Modoi, A. Orsatti, C. Pelea, D. Vălcan, H. Wiesler.

Last but not least, we should stress that all his mathematical activity was influenced by his teaching abilities. He is author and coauthor of 10 books for students or for experts in algebra. All these books are the fruit of his rich and successful teaching activity. Three of them were published by Kluwer Academic Publisher (now a part of Springer Verlag): *Exercices in Basic Ring Theory* (with P. Hamburg), *Lattice Concepts in Module Theory*, *Exercises in Abelian Group Theory* (with S. Breaz, C. Modoi, C. Pelea, D. Vălcan).

For a complete image on the exceptional work of Grigore Călugăreanu, both a teacher and a researcher, we present here the most important issues of his mathematical activity.

Papers

1. On the S. N. Bernstein polynomials. The operator spectrum. (Romanian) Gaz. Mat., seria A, vol. 71, nr.12, 448-451, 1966.

2. Remarks on triples in enriched categories (with H. Wiesler). Bull. Australl. Math. Soc., vol. 13, nr. 3, 375-383, 1970.

3. A variety of associative structures with one-sided zero elements in autonomous categories. Rev. Roum. Math. Pures et Appl., tome 17, 1317-1322, 1972.

4. Conjugation relations in gamma-categories. Studia Univ. Babeş-Bolyai, Series Math.-Mech., fasc. 2, 5-10, 1974.

5. Categories whose objects are determined by their rings of endomorphisms. Bull. Australl. Math. Soc., vol. 15, nr. 1, 65-72, 1976.

6. On an enriched theory of modules I. Studia Univ. Babeş-Bolyai, Math., fasc. 3, nr. 2, 25-38, 1979.

7. On an enriched theory of modules II. Studia Univ. Babeş-Bolyai, Math., fasc. 3, nr. 2, 3-17, 1980.

8. Some remarks about pseudocomplements in lattices. Mathematica, vol. 22(45), nr. 2, 237-239, 1980.

9. Note on B-high subgroups of abelian groups. Mathematica, vol. 23(46), nr. 1, 9-10, 1981.

10. Torsion in lattices. Mathematica, vol. 25(48), nr. 2, 127-129, 1983.

11. Restricted socle conditions in lattices. Mathematica, vol. 28(51), nr. 1, 27-30, 1986.

12. Abelian groups with pseudocomplemented lattice of subgroups. Studia Univ. Babeş-Bolyai, Math., vol. 31, fasc. 3, 39-41, 1986.

13. Abelian groups with continuous lattice of subgroups (with K. Benabdallah). Studia Univ. Babeş-Bolyai, Math., vol. 32, fasc. 1, 31-32, 1987.

14. Cocompact elements in algebraic lattices. Seminar of Algebra, 41-46, Univ. "Babeş-Bolyai", Cluj-Napoca, 1988.

15. Cocompact elements in algebraic lattices. Proceedings of the Braşov Conference, 83-88, 9-10, June 1988.

16. Torsion-free components in non-splitting mixed abelian groups. Preprint nr. 2, Univ. Babeş-Bolyai, Cluj-Napoca, 7-8, 1990.

17. Socle and radical as pure subgroups of an abelian group. Mathematica, vol. 33(56), nr. 1-2, 17-20, 1991.

18. Torsion-free components and topology. Proceedings on the Conference on Algebra (Cluj-Napoca,1991) pp. 7-8, Preprint 92-1, "Babeş-Bolyai" Univ., Cluj-Napoca 1992.

19. La T-topologie d'un groupe abelien. Studia Universitatis Babeş-Bolyai, Mathematica, XL, 4, 3-12, 1995.

20. Note on a module-theoretic exercise. Mathematica 37(60), nr. 1-2, 57-59, 1995.

21. Correction: La T-topologie d'un groupe abelien. 1996, Studia Universitatis Babeş-Bolyai, Mathematica, XLI, 3, 107-108.

22. Cocompact lattices. Mathematica Panonica, vol. 7, nr. 2, 185-190, 1996.

23. Distributively generated lattices. Analele Ştiintifice ale Universităţii "Al. I. Cuza" din Iaşi, vol. 42, fasc. 2, 233-238, 1996.

24. Pure subgroups of mixed abelian groups including the torsion part. Mathematica vol. 39(62), nr. 1, 29-35, 1997.

25. Essential-pure subgroups of abelian groups. Mathematica, vol. 39(62), nr. 2, 195-200, 1997.

26. Coatomic lattices and abelian group topics. Libertas Mathematica, XVII, 125-131, 1997.

27. On a problem of Prof. A. Orsatti. Abelian groups, Module Theory, and Topology (Proceedings in honor of Adalberto Orsatti 60-th birthday, Padova june 1997). Lecture Notes in Pure and Applied Math., vol. 201, 105-112, Marcel Dekker, 1998.

28. Purity in Γ-lattices. Mathematica, vol. 40(63), nr. 2, 155-158, 1998.

29. Torsion in Γ-lattices. Studia Universitatis Babeş-Bolyai, Mathematica, XLIII, 1, 1-5, 1998.

30. Purity in ideal lattices. Analele Stiintifice ale Universitatii "Al. I. Cuza" din Iasi, XLV, s.I.a., fasc. 1, 39-44, 1999.

31. A useful category for mixed abelian groups, Theory and Applications of Categories, vol. 5, no. 4, 81-90, 1999.

31'. Extending Abelian groups. Preprint, 1999.

32. Hypergroups associated to lattices. (with V. Leoreanu) Italian Journal of Pure and Applied Mathematics, No. 9, 165-173, 2001.
33. The fully-invariant-extension property for abelian groups. (with G. Birkenmeier, L. Fuchs and P. Goeters) Communications in Algebra, 29, 673-685, 2001.
34. Abelian groups with semi-local rings of endomorphisms. Communications in Algebra, 30 (9), 4105-4111, 2002.
35. Abelian groups have/are near Frattini subgroups. (with S. Breaz) Commentationes Mathematicae Universitatis Carolinae , 43, 3, 2002, 395-405.
36. Fully-invariant elements in lattices. Mathematica, Tome 45(68), No. 1, 19 - 24, 2003.
37. Breaking points in subgroup lattices. (with M. Deaconescu) Proceedings, Groups St Andrews 2001 in Oxford (Volume 1), 59 - 62, Cambridge University Press , 2003.
38. Distributivity and IM-lattices. (with R. Khazal) Italian Journal of Pure and Applied Mathematics, vol. 15, 175-184, 2004.
39. The total number of subgroups of a finite Abelian group. Scientiae Mathematicae Japonicae, 60, No. 1, 157-167, 2004.
40. Abelian groups whose subgroup lattice is the union of two intervals. (with S. Breaz) Journal of the Australian Mathematical Society 78, 27-36, 2005.
41. On torsion-free periodic rings. (with S. Breaz and R. Khazal) Int. J. Math. Sci., vol. 2005, no. 14, 2321-2327, 2005.
42. Abelian groups determined by subgroup lattices of direct powers, Archiv der Math., vol. 86, no. 2 (2006), 97-100.
43. Self-c-injective Abelian groups. (with S. Breaz) Rend. Sem. Mat. Padova, vol.116 (2006), 193-204.
44. Every Abelian group is determined by a subgroup lattice, (with S. Breaz) to appear in Studia Scientiarum Mathematicarum Hungaricae (2007).

Books

(except for 7, 8, and 9 all are written in Romanian language)
1. Collection of Problems of Algebra, fasc. 3: Rings and Fields. Babeş-Bolyai University Publishing House, Cluj-Napoca 1978 (58 pages).

2. Lattice Introduction in the Theory of Abelian Groups. Babeş-Bolyai University Publishing House, Cluj-Napoca 1983 (109 pages).
3. Exercises and Problems of Rationing, Perspicacity and Ingenuity. Expert Press, Cluj-Napoca 1992 (64 pages).
4. Solutions of the difficult Problems in the Manuals of Algebra of the 4 (high-school) terminal classes. Expert Press, Cluj-Napoca 1992 (64 pages).
5. Introduction to the Theory of Abelian Groups. Expert Press, Cluj-Napoca 1994 (303 pages).
6. Lectures of Linear Algebra. Babeş-Bolyai University Publishing House, Cluj-Napoca 1995 (83 pages).
7. Exercises in Basics of Ring Theory (with P. Hamburg). Kluwer Academic Publishers, Holland, 1998 (212 pages).
8. Lattice Concepts of Module Theory. Kluwer Academic Publishers, Holland, 2000 (238 pages).
9. Exercises in Abelian Group Theory (with S. Breaz, C. Modoi, C. Pelea and D. Valcan). Kluwer Academic Publishers, Holland, 2003 (361 pages).
10. Fundamentals of Abelian Group Theory (with S. Breaz). Editura Academiei Romane, Bucharest, 2005 (374 pages).

Visits Abroad

• 1993 COST - Research with Prof. Bernard Charles, Universit Technique du Languedoc, Montpellier 2
• 1995 TEMPUS - Teaching Algebra in University - Universita degli Studi din Padova
• 1997 NATO-CNR - Research with Prof. Adalberto Orsatti, Universita degli Studi di Padova
• 1999 FULBRIGHT - Research with Prof. Laszlo Fuchs, Tulane University, New Orleans, LA