REMEMBERING VINICIO BOFFI

Giovanni Frosali
Università di Firenze (Italy)
giovanni.frosali@unifi.it

Giampiero Spiga
Università di Parma (Italy)
 giampiero.spiga@unipr.it
Vinicio Boffi was born on August 17, 1927, in Montopoli Sabina (Rieti) and passed away on August 11, 2010, in Bologna.
Montopoli Sabina
(Rieti)
With engineering and mathematics degrees from the University “La Sapienza" in Rome, Vinicio Boffi has shown his interest in applications and dedication to mathematical rigor. The fruitful intertwining of these two topics would become the leading theme of his scientific activities.

With a grant NATO in 1960, he spent an year at the “John Jay Hopkins Laboratory” of the General Atomics Division in San Diego, city that he has kept in his heart for all his life.

After a brief assignment at the National Nuclear Energy Committee (C.N.E.N.) and after having obtained the teaching habilitation (Libera Docenza) in nuclear reactor physics (perhaps the first person ever to have done that in Italy), in 1973 he was hired as a professor by the University of Bologna.

In 1989 he moved to the University of Rome ”La Sapienza” from where he retired in 1997.
Vinicio’s scientific activity was initially focused on transport theory - primarily neutron, but also electron and photon transport theory.

Later he moved to kinetic theory and plasma physics and, according to a definition coined by him, initiated and developed the so-called extended kinetic theory which brings together within a unified description the nonlinearities typical to the kinetic theory of gases and the non-conservativity which occurs when dissipation and chemical and nuclear reactions are taken into account.

Vinicio Boffi’s first article appeared in Annals of Physics in 1960 and deals with the theory of neutron slowing down, a crucial topic in a field that, at the time, was rapidly expanding due to the pioneering ideas of Enrico Fermi and the practical need to safely manage nuclear reactors.
Various interesting publications on this topic would follow, also in collaboration with younger colleagues such as V. Molinari and R. Scozzafava.

The topics studied by Vinicio in his more than 200 publications range from typical reactor physics and engineering issues such as extrapolation lengths, reactivity, and albedo, to the analysis of mathematical evolution problems, the study of linear and nonlinear integro-differential equations of Boltzmann type, analytical and numerical solution methods, and the search for exact solutions.

In this respect it is worthwhile mentioning his 1974 book on neutron transport theory, an essential part of his historical reactor physics course, a monumental and comprehensive two volume publication of over 1200 pages.
In general, the study of the linear Boltzmann equation was the dominant topic of the initial period of his scientific life. In these years the so-called "Caseology," originating from K.M. Case and his school at Ann Arbor (University of Michigan) and largely developed by his students in the United States, in particular at the Virginia Polytechnic Institute and State University in Blacksburg and the University of California at Los Angeles, had a major impact.

Vinicio Boffi contributed to “Caseology” with an equivalent version based on integral transformations developed together with his collaborators, primarily in Italy and elsewhere in Europe.

Later on, as indicated above, his interests shifted towards gas kinetic theory and therefore to the nonlinear Boltzmann equation, gas mixtures, and nonconservative interactions.
Vinicio Boffi (17 agosto 1927 – 11 agosto 2010) è stato un matematico italiano, professore ordinario di Metodi Matematici Applicati all’Ingegneria presso il Dipartimento di Meccanica ed Aeronauteica dell'Università degli studi di Roma "La Sapienza", aveva insegnato in precedenza presso l'Università degli Studi di Bologna.


Pubblicazioni [modifica]

Vinicio Boffi è stato autore o co-autore di articoli su riviste accademiche di fisica e matematica fra il 1960 e il 2002 ed è stato autore o curatore di volumi e atti di convegni fra il 1957 e il 1996.
Space-Time Flux Distribution in Neutron Transport Theory

V. C. BOFFI

Comitato Nazionale per l’Energia Nucleare, Centro di Calcolo di Bologna, Bologna, Italy

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Abstract. The exact integration of the space-time dependent Boltzmann equation which governs the flux distribution of monoenergetic neutrons in the case of infinite medium, spherically symmetric scattering and isotropic infinite planar pulsed source is worked out.

Separation of the two contributions due to the pole and essential singularity, respectively, of the Fourier transform of the sought total flux and application of the method of steepest descents allow to make a qualitative and quantitative comparison between the result of the simple diffusion theory and that one here obtained in the framework of the rigorous transport theory.

\[ f_{\text{pole}}(z, t) = \frac{v}{(4\pi D_0 t)^{1/2}} \left[ 1 - \frac{3}{10} \left( \frac{z}{vt} \right)^2 - \left( \frac{z}{vt} \right)^4 - \frac{3,807}{56,000} \left( \frac{z}{vt} \right)^6 - \right. \]

\[ - \frac{657}{5,600} \left( \frac{z}{vt} \right)^4 - \frac{31,841,991}{689,920,000} \left( \frac{z}{vt} \right)^8 \ldots \] \times \exp \left\{ -\frac{z^2}{4 D_0 t} \left[ 1 + \frac{3}{20} \left( \frac{z}{vt} \right)^2 + \frac{81}{1,400} \left( \frac{z}{vt} \right)^4 + \frac{243}{8,000} \left( \frac{z}{vt} \right)^6 + \ldots \right] \right\}, \quad (45) \]

The results obtained for the continuum, from which the asymptotic behaviour of the components which is used for in that is, the concerned, also successfully be

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In particular we would like to emphasize his collaboration and his friendly relationship with Jerry Pomraning at UCLA.

Vinicio has given invited talks in practically every part of the world and at numerous international conferences, making him for many years a leading contributor to a prestigious series of conferences.

In particular, he was one of the most active participants in the “International Conference on Transport Theory" series which this year is celebrating its 22nd edition here in Portland (OR).
In the same vein, I would like to remember Vinicio as the organizer, together with Paul Nelson, of the ninth ICTT in Italy, June 10-14, 1985.

Vinicio raised funds to cover the travel of all the speakers and the meals, lodging, and social activities for all the participants and their guests.

These activities included an excursion to the beautiful medieval town of San Gimignano, followed by a magnificent banquet with an uncountable number of courses accompanied by what appeared to be a substantial fraction of the yearly Italian output of wine and grappa.
Montecatini, 1985
For his long and distinguished scientific and didactic activity, Vinicio received numerous awards, accolades, and recognition as witnessed by the positions of great prestige and leadership that he occupied in the Italian and international scientific community.

A constant of his life was his care and concern about young people and his continuous efforts in encouraging and supporting them.

“Facciamo largo ai giovani” (“Give youth a chance”) was one of his favourite sentences.
In particular, Vinicio left an indelible mark as the director of the National Mathematical Physics Group (G.N.F.M.) of the National Research Council (C.N.R.) for many years.

In that position, he turned the Group into a generous source of support for the development of mathematical physics and applications of mathematics in Italy.

Moreover, he has contributed in a crucial way to the establishment of the Italian Society of Industrial and Applied Mathematics (S.I.M.A.I.) whose first president he was until 2000.
Both as director of G.N.F.M. and as president of SIMAI, he was the initiator and supporter of a variety of agreements and research contracts -with C.N.R. in Italy, and with various international organizations.

In these capacities, Vinicio has proven time and again that he was not only a scientist and an educator, but a man with a passion, a vision, and a heart.
Thanks for your attention!