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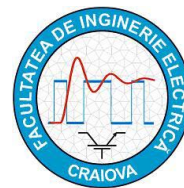
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This issue is dedicated to the 65th anniversary of
Higher education in electrical engineering at Craiova
and to the 40th year of uninterrupted apparition of the
journal Annals of the University of Craova, Electrical
Engineering series

Professor Aurel CAMPEANU at his 80th anniversary

Professor Aurel Câmpeanu was born on the 6-th of August 1935, in Calafat town, Dolj County. He followed secondary-school classes at «Nicolae Bălcescu» Popular College in Craiova, which graduated with praiseworthy diploma in 1953. In 1953 he was admitted without exam at the Faculty of Electrotechnics of the Institute of Electrical Machines and Apparatus in Craiova. In 1958 he graduated the Faculty of Electrotechnics in Craiova as part of the Polytechnic Institute from Bucharest, obtaining engineer diploma.



He started his professional activity as an electrotechnical engineer in the Central Laboratory of Electroputere Factory in Craiova (1958 – 1963). In 1963 he occupied the position of university assistant and then lecturer at the Department of Electrical Machines in the framework of the Faculty of Electrotechnics of the Polytechnical Institute of Timișoara where he collaborated with Academician Professor Toma DORDEA. In 1969 he presented his thesis for a doctor's degree entitled «*Study of two mechanically coupled synchronous machines, connected to a common network*», under the guidance of Academician Toma DORDEA, obtaining PhD title.

Since 1970 he has been going on his higher education and research activity in the framework of the University of Craiova, Faculty of Electrotechnics, where he occupied successively positions from lecturer to full professor. Since 2005 he is honorary professor in the framework of the Faculty of Electrical Engineering.

Testing engineer in Electroputere Factories – Central Laboratory.

In this quality he had the following contributions:

- he carried out *Testing Method in heating for transformers with three windings of high power and unequal*, which made dispatch possible, with important economic consequences, towards beneficiaries of transformers rated at 5/3/2 MVA (for India) and 40/30/30 MVA (for Poland); that method was acknowledged as an invention;

- he established a *method of recoverable test for synchronous machines rated at powers which sensitively exceed the power of the testing stands*. That made possible the industrial test, including in heating and avoiding, on this basis, the operation problems. That method was acknowledged as an invention and included in the IEC-60034-2 Standard elaborated by the International Electrotechnical Commission, regarding tests of electrical machines;

- he directly participated in homologating all the machines and transformers which were to be manufactured, including the motors and generators of the first generation of electrical diesel railway engines.

Teacher at the Polytechnic Institute in Timișoara.

This period is fundamentally marked by the presence of Academician Toma Dordea. The first meeting had taken place, without professor's knowledge, in the third year of studies, when Academician Toma Dordea came to Craiova as a President of the State Exam. He frequently expressed his gratitude to Professor's essential contribution in his professional formation as well as in a larger context.

Beside the current academic activity as an assistant and lecturer and the participation in research projects with Electromotor Factory Timișoara:

- he worked for elaborating, under Professor's coordination, the doctorate thesis "*Study of two mechanically coupled synchronous machines, connected to a common network*", original research, which carried out theoretical bases of a particular operation regime of synchronous machine and which had as a final purpose the method acknowledged as an invention and tested in Electroputere Factory;

- the publication activity and participating at conferences became a major preoccupation.

Teacher at the University of Craiova

He followed all the university stages of lecturer and professor, the disciplines taught being those afferent to electrical machines; he was head of department, pro-rector and dean. Professor Campeanu considers student as a close partner, that any failure must be equally assumed by teacher, too, which cannot be a simple provider of professional information, however high.

Concomitantly, he persevered in the activity of scientific research, constantly appreciated as being compulsory for a professor. His research activity has materialized in:

- over 200 scientific papers published in the most prestigious Romanian reviews ("Revue roumaine des sciences techniques – Série Electrotechnique et Energétique") and international reviews ("Electrical

Engineering-AfE”) or in outstanding international conferences ICEM (Vilamoura, Marseille, Rome, Helsinki), ELECTROMOTION (Patras, Bologna, Bodrum, Marrakesh, Lausanne, Lille) PEMC (Warsaw, Budapest), SPEEDAM (Capri, Ischia), EUROCON (Warsaw) IPEMC (Shanghai), IEMDC (Antalya) OPTIM (Braşov), AECE (Bucharest), ICED (Rome, Helsinki) PCIM (Nuremberg) EDPE (Dubrovnic) ACEMP (Kusadasi) etc.

- 13 books; among them, “Electrical machines. Basic problems, special and of optimal operation” was awarded the “Traian Vuia Prize” of the Romanian Academy; two books which approach present problems regarding modelling and simulation of alternating current machines published in the Academy Publishing House are appreciated by Academician Toma Dordea as publications elaborated at a high scientific level which surely satisfy the necessity of perfecting specialists which work in the area of electrical machines design and performant electrical drives, university teaching staff, master students and trainers for a doctor’s degree;

- research contracts, being Director of Grant with World Bank and Director of Tempus I, II Programs; these referred to perfecting and modernizing through advanced studies and doctorate at the Faculty of Electromechanics of the University of Craiova; all the teaching staff got mobilities in university centres in France, Belgium, Spain, Italy and all the laboratories of the faculty were modernized etc.

The favourite research area of Professor Aurel Câmpeanu has been connected with dynamic regimes of electrical machines, with an original approach, activity materialized in papers and books acknowledged in our country and abroad. Among the original contributions of Professor Profesorului Aurel Câmpeanu we can mention:

1. Elaborating the theory of a general method of testing in heating for transformers with three windings of high power and unequal;
2. Elaborating the generalized unitary theory of dynamic mathematical models of induction machine using representative vectors;
3. Elaborating the unitary theory of dynamic mathematical models of synchronous machine considering saturation and magnetic asymmetry;

Acknowledgements of scientific activity in our country and abroad.

Here are a few reference points of professional and scientific acknowledgement of Professor Aurel Câmpeanu:

- Permanent expert from Romania at International Electrotechnical Comitee IEC-WG 28 (present at meetings in Madrid, Toronto, Paris, Montréal, Zurich, Berlin, St. Petersburg, Helsinki, Heidelberg, Brno, Milano, London etc.);

- “Traian Vuia Prize” of the Romanian Academy (1991);

- Titular member of the Academy of Technical Sciences of Romania. Vice-president of the section Electrotechnics - Energetics, President of ASTR – territorial branch of Craiova;

- Doctor-Honoris Causa of the Technical University of Moldova- Chişinău, North University of Baia Mare, “Gh. Asachi” Technical University - Iaşi, “Stefan cel Mare” University - Suceava, “Eftimie Murgu” University - Reşiţa;

- Invited Professor with papers to universities from abroad (France, Belgium, Spain, Switzerland, Canada);

- Invited Professor to the International Conference of European Universities, CESAER, (Belgium) with the theme “Transfer of technology from universities towards industry”;

- Honour Distinction of the Senate of the Technical University of Cluj - Napoca;

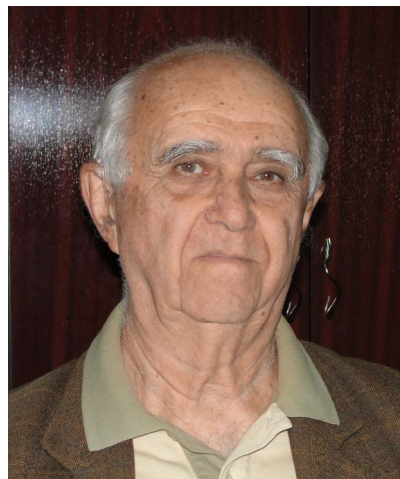
- Diploma of Honoured Emeritus Professor of the University of Craiova;

This is the survey of an activity devoted to professional and responsible formation of over 50 generations of engineers, from among over 45 in the framework of the University of Craiova, in general to scientific knowledge.

Prof.dr.ing. Ioan C. POPA

Professor Grigore CIVIDJIAN at his 80th anniversary

Professor Grigore A. Cividjian was born in Chişinău (Republic of Moldova) on 12 January 1936. He followed the National College Carol I in Craiova between the years 1946 and 1953, when the name of this famous school was Popular College « Nicolae Bălcescu ». He graduated from the Craiova Institute of Electrical Machines and Apparatus in 1958 and sustained his graduated work in Polytechnic Institute of Bucharest in the summer of



1963, obtaining the engineer diploma in electrical machines and apparatus. In 1966 he began the doctoral study in theoretical electricity at Gh. Asachi Polytechnic Institute of Iassy with Professor dr. doc. ing. Gheorghe VASILIU, considered worthy successor of illustrious Dragomir Hurmuzescu and Ştefan Procopiu and also the mathematical study at University of Craiova. He sustained the thesis entitled “Contributions to the optimization of the parameters of shading coils from the electromagnets of control apparatus” and obtained his doctor (PhD) diploma in theoretical electricity in Polytechnic Institute of Iassy in 1970. In the next year he graduated from the University of Craiova with license in mathematics.

He began his activity as worker in local industry enterprise ILMET Craiova in 1958 in the metrological verification of high pressure mechanical installations, measuring instruments and electrical elevators and from May 1960 he is electrical installations designer in project institute DSAPC Craiova.

In September 1967 he was transferred as assistant in the new opened University of Craiova, in 1969 is promoted as lecturer and from 1977 he won a contest for associated professor of Electrical Apparatus.

In 1972 he made a 1 month formation stage in Bucharest Polytechnic Institute in *modeling the electric and magnetic fields* and in 1973 a 3 month formation stage in *switching arc phenomena* in the Sankt Petersburg Polytechnic institute.

In 1990 as result of contest he become university professor and PhD supervisor. In 1997 he is awarded with the title of professor emeritus of the Craiova University.

From 2006 he is consulting professor, associated to the Electrical Engineering faculty and director of the IEETE research center.

Prof. G. A. Cividjian was head of the department of Electrical Apparatus between 1990 and 2004 and along the years gave the following courses: Electrical apparatus (equipment), Statistical models and reliability (both in Romanian and French), Computer aided design of electrical apparatus, Special problems of electrical apparatus-switching in vacuum and SF₆, Electro-physical devices (in Romanian and French). However his courses were at a high scientific level, sometimes difficult to understand, he was very appreciated by the students, being very close to them.

As invited professor he gave some lectures in the University of Perugia (Italy, 1999) and in Technical University of Sofia (Bulgaria, 2001). He participated with contributions at international doctoral schools as Budva (Serbia and Montenegro, 2004), Ohrid (Macedonia, 2005), Nis, CEMBEF (Serbia, 2009).

He made short documentation visits in several universities as Lancashire from Preston (GB), TEI Patras (GR), Bochum (D), University of Toulouse (F) by program Tempus, INSA Lyon (F) by program Erasmus, University of Sherbrooke, Ecole Polytechnique de Montréal, Ecole de Technologie Supérieure (Canada), University of Nis (YU), Technical University of Brno (CZ), University of Delft (NL).

The research was and is his permanent activity, materialized in large part with solutions for practical problems occurring in industry or research institutions. From 2001 prof. G. A. Cividjian is the director of the Research Center for Electrical Energy Engineering and Ecological Technology (IEETE) of University of Craiova. His research activity can be summarized as follows:

146 published research papers in national and international revues as “Rev. Roum. Sci. Tech. Electrotechnique et Energetique », « Electrotehnica, » « Studii si cercetari ale Academiei – Fizica si Stiinte Tehnice, » and « Archiv für elektrotechnik », « Elektrotehnika », « Izv. VUZ - Elektromehanika », « Elektrichestvo », “IEEE Transactions on Magnetics”, “Compel”, “Serbian Journal of Electrical Engineering”, “Electrical Engineering (PI)”, or in proceedings of international conferences as “Modelling, Simulation & Control, A, AMSE Press”, “Accelerators'92, Seventh Conference on Applied Accelerators, St. Petersburg, 16-18 June, 1992, “Seventh Int. Conf. on Switching Arc Phenomena, SAP' 93”, “The 5-th International Conference on Electrical Fuses and their Applications, ICEFA'95, 25th - 27th Sept., 1995, VDE Verlag, Technical University Ilmenau, Germany”, “7-th

International IGTE Symposium on Numerical Field Calculation in Electrical Engineering, Proceedings, p. 1, Graz, Austria, Sept. 23-25, 1996”, “Numelec' 97, Seconde Conférence Européenne sur les Méthodes Numériques en Electromagnétisme, 19-21 mars, 1997, Ecole Centrale de Lyon, France”, “International Symposium on Short-circuit currents in Power systems, Brussels (Belgium), 8-10 October, 1998”, *Symposium on Physics of Switching Arc*, TU Brno (Czech Rep.), 1994 – 2005.
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Prof. G. A. Cividjian is the author of the textbooks “Aparate electrice, Reprografia Universitatii din Craiova, 1970, 1972”, «Aparate electrice – Izolatie si arc, 1996” and the first author of the textbook , “Modèles statistiques et fiabilité, Université de Craiova, 2003”. He contributed as coauthor at two monographs on electrical technologies (coordinated by F. T. Tanasescu e. a.) published in Romanian Editura Academiei (2002) si Editura AGIR (2011) with the chapters on Magnetic separation (I. Bahrin, G. Cividjian), pp. 346-392 and respectively Acoustic emission (N. Cividjian, G. Cividjian) pp. 549-598 and also at the proceeding of selected papers edited by S. Wiak and E. Napieralska-Juszk: Computer field models of electromagnetic devices, IOS press, Amsterdam, Berlin, Oxford, Tokyo, Washington DC, 2010, 935 p.:with Exact expression of corner reluctances in a magnetic circuit of rectangular section, (E. Matagne, G. A. Cividjian and Virginie Kluyskens), pp.134-142;

- He coordinated also 37 scientific research projects and is co-author of 3 invention brevets.

The main research directions of his activity are the modeling of electric and physical phenomena and processes, the optimization of electrical equipment and statistical models in engineering. Between his original contributions can be cited:

1. Optimization of the parameters of electromagnet shading coils with and without consideration of leakage flux;
2. Internal and external inductance of the coils with rectangular cross-section and application to the electromagnet design.
3. Contribution to the theory development of fragmented core transformers and of high voltage direct current cascade generators for industrial and medical accelerators.
4. Modeling the potential 2D strong no uniform fields: formulas for “corner permeance (capacitance)”, ‘corner force”, “constriction permeance”, “distorted constriction resistance” etc.
5. Modeling the physical processes in electrical apparatus and equipment; black-box arc model, lightning surges in transformers, thermal field diffusion in cylindrical items.

The research activity of prof. Cividjian is largely recognized in the world. He is member of several professional and scientific organizations as Romanian Electrical Committee CER (CT8), ASER (electrostatics), ACER (electrical compatibility), Fuse Club, member of IBC Advisory Council. He is also member of several scientific committees of international conferences as ICATE, SIELA, PES, SAP and member of editorial board of revues as Serbian Journal of Electrical Engineering and Annals of the University of Craiova – Electrical engineering. He was or is expert evaluator for INTAS, GACR (Czech Scientific Foundation), GNSF (Georgian National Science Foundation), FP-7 and voluntary reviewer for prestigious revues as IEEE Transaction on Magnetics (SUA) and COMPEL - The international journal for computation and mathematics in electrical and electronic engineering.

This is a short review of an activity dedicated to the professional formation of 49 generations of engineers and of an distinguished scientific research activity of the professor Grigore A. Cividjian.

Prof. dr. ing. Ioan C. POPA

Comparison of the Conservative Power Theory (CPT) with Budeanu's Power Theory

Leszek S. Czarnecki, *IEEE Life Fellow*

Louisiana State University / School of Electrical Engineering and Computer Science, Baton Rouge, USA
lczarn1@lsu.edu

Abstract - It is shown in this paper that the Conservative Power Theory (CPT) describes power properties of electrical circuits in a way which has a strong analogy to this description in terms of Budeanu's power theory which misinterprets the power phenomena in such circuits. Also, similarly as Budeanu's power theory, the CPT does not create right fundamentals for the power factor improvement by reactive compensation. Moreover, Budeanu's power theory is no less "conservative" than the Conservative Power Theory, thus both theories can be referred to as conservative ones.

Keywords: power definitions, reactive current, reactive power, distortion power, Currents' Physical Components, CPC.

I. INTRODUCTION

The first power theory of electrical systems with nonsinusoidal voltages and currents was suggested [3] by Budeanu in 1927. It was a response to Steinmetz experiment performed in 1892, which challenged the concept of the reactive power [1]. The Conservative Power Theory (CPT), presented in [15] by Tenit and his co-workers in 2003, seems to be the latest attempt aimed at developing such a theory. Comparison of these two power theories is just the subject of this paper.

The power theory of electrical systems is focused on two questions that are fundamental for the electrical engineering: **(i) why can the apparent power S be higher than the active power P** and **(ii) how can this difference be reduced?** The first question is cognitive in its nature, the second question is practical.

The period of 76 years which separates these two concepts of the power theory was filled with numerous attempts, com-piled in [22], aimed at providing answers to these two questions. In effect of these attempts the difference between the apparent and the active powers, S and P , can be now explained in terms of power related phenomena in electrical loads. Fundamentals of compensation, i.e., reduction of the difference between these two powers, in the presence of distortion and asymmetry were developed as well. Development of the Currents' Physical Components (CPC) – based power theory [9, 16] was crucial for the present state of the knowledge on the power properties of systems with nonsinusoidal and asymmetrical voltages and currents and on compensation in such systems.

The CPC – based power theory was developed in the frequency-domain, i.e., using the concept of harmonics. In this respect the development of the CPC-based theory has followed Budeanu's frequency-domain approach.

The Conservative Power Theory (CPT) has occurred after the development of the CPC – based power theory was almost completed. It seems that development of the CPT was motivated by an old postulate formulated by Fryze [4] in 1931, that the power theory should be formulated in the time-domain, i.e., without any use of the concept of harmonics and such a theory should be based on the load current decomposition into orthogonal components.

The CPT satisfies Fryze's postulates, nonetheless, it describes the power properties of electrical loads in a way, which has a strong analogy to description of these properties in terms of Budeanu's power theory. Unfortunately, as it was demonstrated in papers [11, 12], Budeanu's power theory misinterprets power phenomena in electrical circuits and it does not provide any fundamentals for their compensation. As it will be shown in this paper the same applies to the CPT.

Development of the CPT started in 2003 in paper [15], where mathematical fundamentals of the CPT for single-phase systems were presented with an extension to poly-phase networks. Later the CPT was focused mainly on three-phase systems [17, 19, 20]. It disseminates in electrical engineering and provides CPT – based interpretations of the power related phenomena in electrical systems and fundamentals for their compensation. Unfortunately, as it will be shown in this paper, the power quantities and the load current components introduced by the CPT are not associated with physical phenomena in the load. It applies first of all to the quantity called in the CPT the "reactive energy" W . The same applies to the reactive and void currents as well to the unbalanced current. These new quantities defined in the CPT can contribute to major misinterpretations of power phenomena and to erroneous conclusions as to methods of reactive compensators design.

The power theory of single-phase systems with nonsinusoidal voltages and currents developed by Budeanu, introduced a new definition of the reactive power Q , denoted in this paper as Q_B , and introduced a concept of the distortion power D_B to the power theory. This theory has gained almost common acceptance [10] in the electrical engineering community and was supported by some standards, such as [8], [13] or [14]. In 1987 it was challenged in [11], where it was demonstrated that the reactive power Q_B as defined by Budeanu is not associated with the energy oscillation between the load and the supply source. Moreover, it was demonstrated that the distortion power D_B is not associated with the mutual distortion of the load voltage and current. It was also demonstrated that there is no relation between the power factor improvement and reduction of the reactive power