



7th International BAPT Conference Dedicated to the 90th Anniversary of Prof. Kiril ARNAUDOV “POWER TRANSMISSIONS 2020”

June 10-13, 2020, Borovets, Bulgaria

Organizers

Balkan Association of Power Transmissions (BAPT)
Scientific-Technical Union of Mechanical
Engineering (STUME)

Co-Organizers

Institute of Mechanics – Bulgarian Academy of Sciences
Technical University, Sofia
Univ. of Mining and Geology “St. Ivan Rilski”, Sofia
Univ. of Chemical Technology and Metallurgy, Sofia

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of BAPT.

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and Founder, 1st President (2001-
2003) and Honor President (since
2012).

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2006).

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Founder.

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Founder.

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gearing expert.

HLEBANJA Jože, Excellent gearing
expert.

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expert.

LINKE Heinz, Excellent gearing
expert.

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The 7th International BAPT Conference “Power Transmissions 2019” is organized by Balkan Association of Power Transmissions (BAPT) and Bulgarian Scientific-Technical Union of Mechanical Engineering (STUME).

This Conference is dedicated to the 90th Anniversary of Prof. Kiril ARNAUDOV!

Professor Kiril Arnaudov needs no introduction. Those who know his work, and even more know him personally, do not need to be persuaded to honor his anniversary. This conference is just another way of doing this together. Let’s wish him health, creative longevity and always, as he likes to say, high efficiency ($\eta > 1$)!

What better gift for Prof. Arnaudov than the high quality of your papers?

Unfortunately we cannot gather in Borovets, but we really hope that we will do it next year.

On behalf of the Organizing Committee

Dr. Dimitar Karaivanov

President of BAPT



Prof. Dr.-Eng. Kiril Arnaudov

Education

Master’s degree in Mechanical Engineering from the Technical University in Sofia (Bulgaria);

PhD (Dr.-Eng) degree from the Technical University of Dresden (Germany).

University Professor

Assistant Professor 1954-1957 in Mining Geology University, Sofia;

Assistant Professor 1957-1964 in Technical University, Sofia;

Associated Professor 1969-1986 in Technical University, Sofia;

Invited Professor in Universities of Gabrovo, Plovdiv, Ruse, Sliven, and Varna.

Research Activity

Permanent work in the area of gear trains and power transmissions;

Head of Research projects of Scientific-research Department of TU-Sofia;

Designer of several research rigs in TU-Sofia;

Results of this activity are presented in a lot of scientific publications and books.

In Help of the Industry

In Bulgaria

Employed

- Plant No. 16;
- “Podemcrane”, Gabrovo.

Under contract or honorary

- “Struma”, Pernik;
- “Bulmachinery”, Radomir;
- “Kranostroene Engineering”, Sofia;
- “Vodokanalproekt”, Sofia;
- “Hranmash”, Stara Zagora;
- “Elprom”, Lovech;
- “Spesima”, Sofia;
- Several Research Institutes in the area of machinery.

Member of the Bulgarian industrial delegation, which visited Japan in connection with the development of heavy gear train manufacturing;

Member of the Expert Council at the Ministry of Mechanical Engineering;

Member of the Expert Council at the Council of Ministers of the Republic of Bulgaria.

Abroad

Employed

- Gertiebewerke Leipzig, Germany;
- ABUS, Dessau, Germany.

Under contract or honorary

- Landwirtschaftliches Institut, Leipzig, Germany;
- PS Automatisierung, Bad Dürkheim, Germany;
- Gearbox Design Center GDS, Switzerland;
- Central Institute of Aviation Motors, Moscow, Russian Federation.

Organizational Activity

Initiator and founder of the Gear Transmissions and Driving Society (member of the Scientific-Technical Union of Mechanical Engineering) in 1971 and its Chairman till nowadays;

Chairman and member of the Organizing Committees of many Conferences – National, International, and a Scientific Congress;

Initiator and founder of the Balkan Association of Power Transmissions (BAPT), its First President (2001-2003) and Honor President (since 2012).

Publications

Co-author in a Textbook and a Handbook on Machine Elements;

Co-author in 6 books on gear trains about:

- Small-module gear trains;
- Plastic gears;
- Planetary gear trains;
- Torque method for investigation of compound planetary gear trains;
- Involute internal meshing
- Investigation of multi-carrier planetary change-gears.

Lead author of BDS 17108-89 (Bulgarian Standard) of load capacity calculations of gears as well as co-author of several standards on gearing (terminology, accuracy, etc.).

Scientific papers at Conferences and Congresses in 19 countries.

Bulgarian Representative

Long years Bulgarian representative in CMEA (Council for Mutual Economic Assistance) – 20 years, ISO and IFToMM (since 1987).

National Recognition

Member of the Expert Council at the Ministry of Mechanical Engineering;

Member of the Expert Council at the Council of Ministers of the Republic of Bulgaria;

Member of Higher Attestation Commission;

Nominated for a corresponding member of Bulgarian Academy of Science;

Honorable member of Scientific-Technical Union of Mechanical Engineering

Awarded:

- Silver and Golden Badge of the Scientific-Technical Union of Mechanical Engineering;
- Award “Academician Angel Balevski” of the Scientific-Technical Union of Mechanical Engineering;
- Golden Badge “Prof. A. Zlatarov” of the Federation of Scientific-Technical Unions in Bulgaria;
- “Excellent of the Ministry of Mechanical Engineering” (1982).

International Recognition

Express translation of a publication on its PhD dissertation in USSR as well as a paper in India ;

A book and a book-chapter published in US;

Invited lecturer in Germany and USSR;

A dissertation reviewer in Germany;

Consultant on a forensic expertise of a patent case according planetary gear train in Germany;

Long years including in the “Board of Gear Excellences” of the Conference on Gears, Munich, Germany;

Member of many Scientific Committees of International Conferences in many countries, including co-chairman of the Gearing Conference in Sevastopol and Odessa, Ukraine.

Member of the Editorial Board of the scientific journal Gearing and Transmissions;

Cited more than 100 times round the World;

Honor President of Balkan Association of Power Transmissions since 2012.

Colleagues and Friends about Prof. Kiril Arnaudov

My personal congratulation to the birthday of my colleague and friend Kyril Arnaudov. I have a lot of respect to his knowledge for planetary transmission and his excellent contribution to the Standardization of involute gears in his life. I have learned a lot of things for planetary transmission in the past from him. I am very happy that I have the opportunity to learn him in my life. I wish the best for him and his family in the future and I hope to see him soon after this worldwide Corona-crisis.

Bernd-Robert Hoehn

As great luck and satisfaction, I look at the fact that my encounter with Prof. Dr. Kiril Arnaudov surrendered. I remember the International Transmission Conference in Munich well when a Bulgarian professor, who spoke perfect German, explained his great contribution, the torque method required for everyday epicyclic design work. The great lecture sounded as natural as if there was nothing easier than understanding planetary gears.

A few years later, professor Arnaudov and I together developed a large drive train for the Altanus type wind turbines up to 15MW, which from today's perspective is still very topical.

I don't know anyone in the gear world whom as longer dealt with load sharing systems than Prof. K. Arnaudov. Every visit to him to Sofia is a further enrichment, both in technical and human terms.

I wish him all the best for his young birthday and hope to be able to share again many exciting technical discussions with him in the next future.

Urs Giger

CEO GGS GmbH

6490 Andermatt

Switzerland

I have known Professor Kiril Arnaudov for more than 35 years as an excellent university teacher who really cares for his students and knows how to “sparkle” their interest in engineering tasks and their love for knowledge. This is due not only to his excellent teaching skills but also to his extraordinary results in scientific research. What I particularly value in his research contributions is that he is able of approaching projects in engineering from various perspectives and he bases his conclusions on in-depth analyses. He has intensively published in the area of gearing and his publications are worldly known and often cited worldwide.

Prof. Lubomir Dimitrov

Technical University, Sofia

Professor Arnaudov. Twenty years later.

In the 90s of the past and the first years of this century Gearing Committee of IFToMM published in Izhevsk the International bilingual scientific journal "Gearing and Transmissions". Professor Arnaudov was an active member of this Committee as well as the editorial board of the journal. And it is quite natural that the journal No. 1 of 2000 had been opened with the following Congratulation:

Editorial Board, colleagues, and friends cordially congratulate a member of the Editorial Board – Professor Kiril Arnaudov with his 70th anniversary.

Prof. Arnaudov was born on May 25, 1930 in Sofia, Bulgaria. He started to work as an engineer at a machine-building factory in Bulgaria, later he worked at two gearbox-building in Germany. His thesis dealing with research and development of planetary gearing was defended in Dresden Technical University, Germany. Later on for many years he worked at the Institute of Mechanics and Biomechanics of the Bulgarian Academy of Sciences.

Prof. Arnaudov is one of leading Bulgarian scientists in the field of gearing. He is the author of more than 100 papers, a co-developer of a great many Bulgarian standards on various aspects of gear analysis and design. His contribution to the improvement of gear terminology is well recognized.

Great international authority of Prof. K. Arnaudov is also well known. He has been representing Bulgaria for more than 15 years in technical committees of such authorized international organizations as IFToMM and ISO. He has repeatedly made presentations at many major international conferences, was a member of program committees of conferences on gearing in Great Britain, Poland, and Russia. In 1995 he was the chief organizer and the Chair of Program committee of the International Congress on Gears in Sofia. In Bulgaria, Prof. Arnaudov has led for over 30 years the National Scientific Gearing Society of the Bulgarian Scientific Union.

Congratulating Professor Kiril Arnaudov with the anniversary, friends, colleagues and Editorial Board wish him good health, creative success and many years of fruit work ahead (end of quote).

Rereading today this long-standing congratulation, we, Russian friends and colleagues of Prof. Arnaudov, are pleased to note that he has fulfilled all our wishes and continues to work successfully. Over the years, he wrote new papers and books, held new international conferences, and most importantly, brought up worthy disciples and successors.

We wish Kiril Borisovich long years of life, at least up to 104 years, as prof. F.L. Litvin. We wish him new achievements in our common effort to improve the gears, those gears, without which any machine cannot rotate, even in today's computerized time.

Sincerely,

S. Lagutin, Dr.-Eng.,
Elektrostal, Russian Federation.

E. Shalobaev, Sc.D., Prof.
St. Petersburg, Russian Federation

Happy Anniversary Celebration!

Dear Professor Arnaudov!

On behalf of community of Belarussian toothy worried scientists and engineers, Joint Institute of Mechanical Engineering of National Academy of Sciences of Belarus, Belarussian National IFToMM Committee heartily congratulate you on memorabile Nonagenarian Jubilee and wish you well-doing, new creative progress in science, wellbeing to you and yours close relatives!

We rate high you as a famous specialist in mechanics with significant input in solution of problem of analysis and synthesis of epicyclic gear trains. By you a number of problems of design of epicyclic gear trains; optimization of gear ratio and computation of efficiency combined multiple epicyclic trains; theoretical and experimental investigations of load carrying capacity/ have been performed, what permitted to raise their reliability and compacfability, to reduce materials consumption.

Due to high level of investigations, wide international cooperation with scientists of different countries and knowledge of foreign languages, yours works on classification and terminology of epicyclic gear trains have been published in the prestigious editions such as "Mechanism and Machine Theory",

"Maschinenbautechnik", "Gearing and Transmissions", "Vestnik of Machinery" and so on. You are the member of numerous committee and commissions of international organizations ISO and IFToMM, program committees of International Scientific Conferences, participant and reporter of scientific results on the forums in Australia, Great of Britain, Germany, Russia, Ukraine, France, Japan and others countries. The volume of fulfilled by you scientific-organizational contribution impress: you are the active member Scientific-Technical Union of Mechanical Engineering of Bulgaria, BAPT Initiator and Founder, the first BAPT President (2001-2003) and Flonor BAPT President (since 2012).

It is necessary to note that Belarussian researchers are active participants of BAPT "Power Transmissions" conferences, as well as in Joint scientific projects with yours Native Institute of Mechanics of Bulgarian Academy of Sciences.

As well known to you we certainly refer to yours founding books - "Fine pitch gears, Sofia. Technica, 1978", "Plastic gear wheels, Sofia. Technica, 1979", "Gear trains with plastic gears, Sofia. Technica, 1985", "Planetary Gear Trains, CRC Press, 2019" and others as well as to your scientific papers.

Wish you, dear Kirill Borisych, long years of activity, emulating example of creative longevity to your pupils and colleagues.

JIME Director General,

Prof. Siarhei Paddubka

Chair of Belarussian National IFToMM Committee,

Prof. Vladimir Algin

Deputy Chair of Belarussian National IFToMM Committee,

Prof. Victor Starzhinsky

“From practice to practice” is the motto of all lectures, books and works of Prof. Arnaudov. The team of Podemcrane had the unique chance to gain valuable knowledge in many carefully prepared lectures with handwritten, neatly drawn by Prof. Arnaudov schemes, presented with a unfailing sense of humor and many examples of practical application.

Along with the numerous consultations and trainings of the design engineers with emphasis on the planetary gearboxes strongly represented in the products of Podemcrane, our long-term joint work took place in two main directions: work on specific technical tasks related to the development of the company's products and development of systematized methods, theory and theoretical calculations summarizing the valuable experience of Prof. Arnaudov, including "Methodology for load capacity calculation of cylindrical gears with internal and external teeth and applications to it", "Geometrical calculation of a planetary gear type 3K for a traveling mechanism of hoists", “Involute Internal Meshing”, and “Planetary gear trains”, also published in the United States.

The research and scientific publications in the field of gear trains and power transmissions of Prof. Kiril Arnaudov are considered and cited as fundamental in the world scientific literature. Leading scientists from around the world pay tribute to his scientific contribution. He is a welcome guest and honorary participant in many international forums, some of which have been chairman, honorary chairman or guest of honor. During our long-term partnership, the technical director of Podemcrane, eng. Stefan Petrov was invited to participate in Munich and present the article with Prof. Arnaudov to BAPT Conference “Power Transmissions’2019” in Varna.

It is an honor for the team of Podemcrane to have the opportunity to work with the great Bulgarian scientist, a highly valued international authority, deservedly named by the newspaper "Science and Society" in issue. 3 of 2011 "the Bulgarian cardinal of the gears", the great optimist and man - Prof. Kiril Arnaudov!

With gratitude, appreciation and best wishes,
Happy 90th anniversary, Professor!

Georgi Stoimenov

Chairman of the Board of Directors
Podemcrane AD