

The school of the asymptotic methods of nonlinear mechanics Krylov – Bogoliubov – Mitropolski

Asymptotic methods of nonlinear mechanics Krylov – Bogoliubov – Mitropolski (see References [65], [2,3], [67-74]) and the school of the same name in Kiev, to the knowledge of my Professor, Dr. Ing and Mathematics Degree Damilo P. Rašković [79] was evaluated in 1967 as the most promising for the education and guidance of a young and talented researcher and teaching assistant, who should be directed toward Nonlinear Oscillations and Nonlinear Dynamics and in general Nonlinear Science. So, to me, Professor Rašković suggested that I do graduate work in Mechanical Engineering from nonlinear oscillations, and I suggested the topic: “*Nonlinear oscillations and applications to nonlinear system with automatic control*” [83]. I successfully defended my diploma work and received the award of Electronic Industry for the best diploma thesis done that year at the Technical and Natural-Mathematical Faculties of Yugoslavia.

Today, Professor G. Rega in reference [80] evaluates asymptotic methods of Nonlinear Mechanics of KBM:

“The Krylov–Bogoliubov–Mitropolski school (at Kiev) (see References [65], [2,3], [67-74] and Figures 3 and 4) searched for the solution of equations of nonlinear systems via analytical (i.e., quantitative) methods, mostly dealing with problems in nonlinear mechanics. Around the middle of the twentieth century and mostly in the 1960s and 1970s, novel theoretical ideas and perspectives (e.g., the topological one), and the innovative contributions of computer science, determined an ‘explosion’ of dynamical system theory, with the strong affirmation of the role of models and the importance of the nonlinear domain, along with intense interactions developed throughout physical and mathematical sciences. Distinct, yet inter-connected, theories sciences. Distinct, yet interconnected, theories were developed (of bifurcation, catastrophe, complexity, chaos, fractals, turbulence), with applications to a wide variety of disciplines including not only physics and engineering but also chemistry, biology, neurology, astronomy, geophysics, meteorology and economics”.



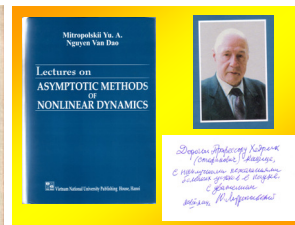
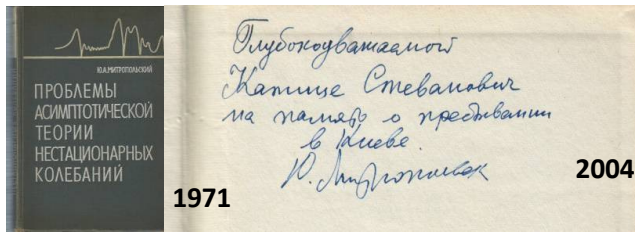
Figure 1. Academician Yu. Mitropolski and N.N. Bogolyubov (photo left), Memorial Plaque on the Read Building of Kiev University (photo middle) and Medail of N.N.Bogolyubov (photo right) (Three Pgotto from the Presentation by academician A. Zagorodny ad Conference on Nonlinearitu 2019)

**Асимптотичний метод
Крилова-Боголюбова-Митропольського**

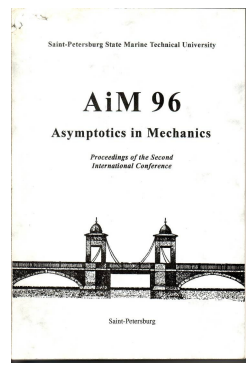
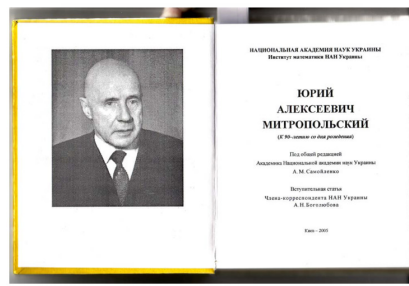
Юрій Олексійович Митропольський
(21 грудня 1916 (3 січня 1917), Шиншани — 14 червня 2008[†], Київ)

Боголюбов Микола Миколайович (старший)
(8 (21) серпня 1909, Нижній Новгород, Російська імперія — 13 лютого 1992, Москва, Росія)

Крилов Микола Митрофанович
(дід: Микола Митрофанович Крилов; 17 грудня 1875, Рязань, Російська імперія — 11 лютого 1954, Москва, СРСР)



*Тубокоубавицата Професору
Катиче Стеванович-Хедрих
На паметъ о многостранна
приказе мене в Косававиле и
радужинам добрам откоме-
ниим. С нежекакимъ даво-
нейшей ценностной работи и
самейно съестна,
10/12/2005г. В. Митропольский*







*Дорога Катича,
по русскому ироничному
"лучше поздно, чем никогда"
попысла Вам трудъ Конферен-
ции,
Всего доброго
Ваш Ринад Бахчисар
17 марта 2005, С-П.*



Figure 2. Founders of the School of Asymptotic Methods of Nonlinear Mechanics (picture left up), Academician Mitropolskiy in Niš in 1984 and Professor Katica (Stevanovic) Hedrih with teaching assistants (picture above right up), two Monographs of Yuri Alekseevich Mitropolskii (picture in middle up) and Cpved of Biobibliography dedicated to Life Jubilee 90th birthday of Yuri Alekseevich Mitropolskii and a certificate of candidate minimum of speciality in Theoretical and Mathematical Minimum (picture in middle down) and cover of Proceedings of The Second International Conference Asymptotics in Mechanics AiM 96 and a Scietufuc Genealogy (Picture down)

International Conference of Nonlinear Oscillations (ICNO) and the European Nonlinear Oscillations Conference (ENOC)

The series of International Conference of Nonlinear Oscillations (ICNO) was held every third year, and continued into the series of European conferences of the International European Nonlinear Oscillations Conferences (ENOC). See details in Figures 5 and 6.

Friedrich Pfeiffer, Garching

50 years

ICNO and ENOC 1961 - 2011

ICNO International Conference on Nonlinear Oscillations
(Conferences I – XII, 1961 – 1990)

ENOC European Nonlinear Oscillations Conference
(Conferences I – VII, 1993 – 2011)


EUROMECH
European Mechanics Society

ENOC VII
July 24 – 29, 2011, Rome


The 12 ICNO - Conferences


| | | | |
|-----------|----------------|-------------------------|--------------------|
| ICNO I | September 1961 | Kiev (USSR) | Chair: Mitropolsky |
| ICNO II | September 1962 | Warsaw (Poland) | Chair: Ziemba |
| ICNO III | May 1964 | Berlin (GDR) | Chair: Reifig |
| ICNO IV | September 1967 | Prague (Czechoslovakia) | Chair: Djadkov |
| ICNO V | August 1969 | Kiev (USSR) | Chair: Mitropolsky |
| ICNO VI | September 1972 | Poznan (Poland) | Chair: Ziemba |
| ICNO VII | September 1975 | Berlin (GDR) | Chair: Schmidt |
| ICNO VIII | September 1978 | Prague (Czechoslovakia) | Chair: Past |
| ICNO IX | September 1981 | Kiev (USSR) | Chair: Mitropolsky |
| ICNO X | September 1984 | Varna (Bulgaria) | Chair: Brankov |
| ICNO XI | August 1987 | Budapest (Hungary) | Chair: Farkas |
| ICNO XII | September 1990 | Cracow (Poland) | Chair: Gutowski |

Figure 3. Two slides from Professor Friedrich Pfeiffer's Lecture on the occasion of half a century since the first ICNO Kiev 1961 (International Conference of Nonlinear Oscillations) presented at ENOC Rome in 2011 (the European Nonlinear Oscillations Conference)




Transition ICNO >>> ENOC







The last activities of ICNO



Yu. A. Mitropolski



D. G. Crighton




The first activities of ENOC

November 28, 1991

Recommendation of Prof. G. Schmidt and Prof. E. Kreuzer to the President of the European Mechanics Society, Professor David G. Crighton, Cambridge, to include ICNO into EUROMECH's Conference Activities.

Decision 1992 to continue ICNO (International Conference on Nonlinear Oscillations) as the EUROMECH Conference ENOC (European Nonlinear Oscillations Conference) with the first ENOC held in Hamburg 1993 under the Chair of Professor Edwin Kreuzer



ICNO International Conference on Nonlinear Oscillations
Kiev 1969 (Yugoslavia, Netherlands and Ukraine)

Figure 4. Professor Danilo P. Rašković (Photo left, in middle right) with assistant and colleagues at the ICNO Kiev 1969 Conference (photo left) and Slide from Professor Friedrich Pfeiffer's Lecture on the occasion of half a century since the first ICNO Kiev 1961 Conference presented at ENOC Rome in 2011 (Picture right)

The first series of ICNO conferences was founded by my Professor Academician Yu.A. Mitropolski from Kiev. The first of these series of conferences was held in Kiev in 1961, and I first time participated in 1969, as a young assistant, brought with me by Professor Danilo Rašković with the intention of introducing me to Academician Mitropolski and obtaining his consent to accept me for training and to study asymptotic methods of nonlinear mechanics. As a

result of the acquired knowledge and further research, references [7, 8, 9], [20] and [84] have emerged, among others. Later, in my research, I used a monograph by two authors, Aly Nayfeh, Dean T. Mook, (1976), *Nonlinear oscillations*, in which my reference [85] was cited, published in the Polish Journal *Nonlinear Oscillations*, and presented at ICNO Conference in Poznan 1972. Professor G. Rega in Reference [80] writes:

“International Conferences on Nonlinear Oscillations (ICNO) was organized in Kiev in 1961 by Yu. A. Mitropolski, the third scientist-founder of the asymptotic methods of nonlinear mechanics referred to in the KBM acronym of the powerful method(s) for the analysis of nonlinear oscillations initiated by N. Krylov and N. Bogoliubov; and the series of ICNO events held every 3 years in different cities of those countries lasted for 30 years, until the last one organized in 1990 in Krakow by W. Gutowski.

Based on a recommendation of G. Schmidt and E. Kreuzer to the chairman of the European Mechanics Council D. Crighton to include ICNO into the society's conference activities, with the full support of Yu. Mitropolski, the relevant scientific tradition and the underlying patrimony of knowledge were inherited by EUROMECH, which started the new series of ENOC events at Hamburg, 1993". For details see Figures 5 and 6.

Series of the Conferences ICNO I attend:

ICNO Kiev 1969, ICNO Poynanj 1972, ICNO Kiev 1981, ICNO Varna 1984, ICNO Kracow 1990. (see Figures 6 and 7).

Numerous times in my hand was the monograph: *Aly Nayfeh, Dean T. Mook, (1976), Nonlinear Oscillations, John Wiley and Sons, 1976, New York*, published first in 1976, but between numerous cited references in this monograph, I haven't read that my paper, published in Poland Journal in 1974, [85], is included in this list of references. I forgot this paper published under my father's family name. In 2016, researcher from my current Project team ON174001 (20011-2019), informed me that my paper titled: *Stevanovich, K. (later merried family name Hedrih) and Raskovich D., (1974), Many frequency vibration in one frequency regime of nonlinear systems with several degrees of freedom, Zagadnienia Drgan Neiliniowych, 15201-220,418.*, is cited in the list of the references of this important monograph. I have learned about this citation only after four decades late.

At the same time in 1976, my other two papers titled:

Katica Stevanovich (later merried family name Hedrih)m (1972), Two-frequency no stationary forced vibrations of beam, Marhematical Physicsm Kiev, Vol. 12, 1972, pp. 127-140. (in Russian language) and

Katica Stevanovich (later merried family name Hedrih), (1971), Transversal vibrations of a beam loaded by system, moving along beam with chengeable velocity, containing mass particles each excited by corresponding single frequency force, Edition Assymptotic and qualitative methods in theory of nonlineat vibradisons, Editor Yu.A. Mitropolyski, Institute of Mathematics Academy of Sciences of USSR , Kiev, 1971, pages 15. (in Russian language).

published in Ukraine, are cited in the list of the references in the monograph, published in 1976, and titled:

Yu.A. Mitropolyski and B.I. Moseenkov: Asymptotic solutions of partial differential equations , Kiev, 1976 (in Russian language).

These three citations through list of the references in two important international monographs of two world important scientists in area of nonlinear mechanics, nonlinear oscillations represent a special honour for me. I was very pleased to learn about scientific relations and warm friendships

between these two scientists, *Ali Nayfeh* (December 21, 1933-March 27, 2017) and *Yuri Alekseevich Mitropolyski* (January 3, 1917-January 14, 2008), known over the world on the basis of their important scientific legates, life after long time up to numerous next generations of the young scientists.

Series of Conferences ENOC I attend:

ENOC 1996, Prague, L. Pust (F. Peterka); ENOC 1999, Copenhagen, H. True; ENOC 2002, Moscow, D.M. Klimov; ENOC 2005, Eindhoven, D. van Campen; ENOC 2011, Rome G., Rega; ENOC 2014, Wien H. Eckerl; ENOC 2017, Budapest, G. Stépan;

Researchers of my team of Project ON174001 “Dynamics of hybrid systems with complex Structures” (2011-2019) was participants of the Series of Conferences ENOC: ENOC 2011, Rome G. Rega; ENOC 2014, Wien H. Eckerl; ENOC 2017, Budapest G. Stépan;

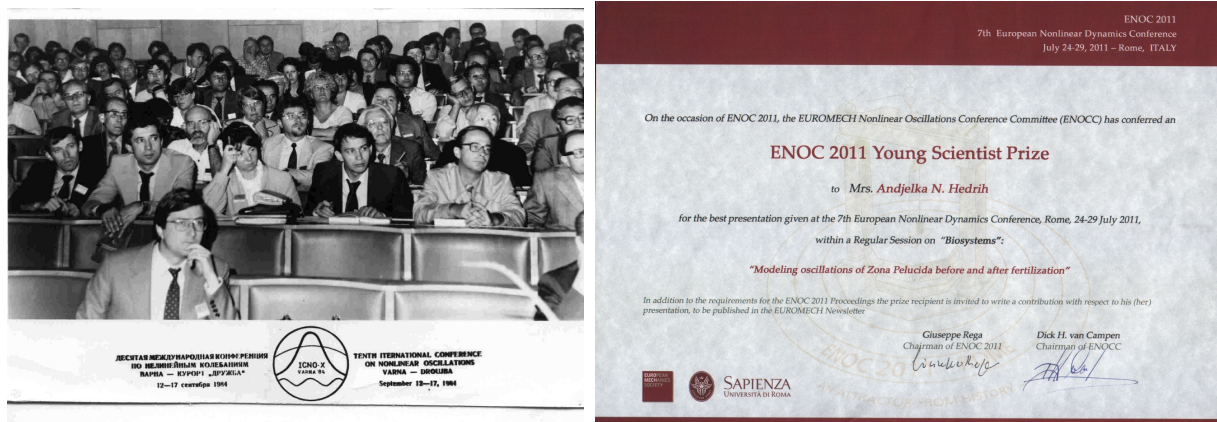


Figure 5. Participants of International Conference of Nonlinear Oscillations Varna 1984 (ICNO Varna 1984) (Picture left) and Diploma of ENOC 2011 Young Scientist Prize of the European Nonlinear Oscillations Conference Rome 2011



Photos in Kiev at December 2007

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We must point out here two original monographs by Yuri Alekseevich Mitropolski [68, 69], which are not sufficiently World known between scientists and researchers, in my opinion, and neither is the theory of asymptotic methods of unsteady-non-stationary oscillations known in application, which represents the original contribution of Yu.A. Mitropolski to this famous, world-renowned, scientific school. On the occasion of Mitropolski's Life Jubilee 90th birthday anniversary, I was honored to be enrolled as an adjuster of that famous scientific school of asymptotic methods of nonlinear mechanics, and on the basis of a well-placed Candidate Minimum of the specialty of Theoretical and Mathematical Physics, which is a postgraduate (aspirant) course, which I authorized for 11 months of training under mentorship Yuri Alekseevich Mitropolskii and with the assistance of A. Lapatom at the Institute of Mathematics of the National Academy of Sciences of Ukraine in Kiev, during 1971.



Serbian Symposium on Nonlinear Mechanics, Arandjelovac, 1984; Invited Lecturer Academician RAN and NANU Yu. A. Mitropolskiy (KIEV) in Niš