

キエフにおける第5回非線形  
振動国際会議の報告

京大 工学部 林 十博  
京大 数 研 占 部 実

第5回非線形振動国際会議は、ウクライナ科学アカデミー  
数学研究所主催のもとに、1969年8月26日から9月4  
日まで10日間、ソ連ウクライナ共和国キエフ市で開かれた。  
非線形振動国際会議はソ連、ポーランド、チェコスロバキ  
ヤ、および東独の科学アカデミーの共催により、ほぼ隔年に  
開かれているもので、前回は1967年プラハで開かれ、次  
回は1972年ワルシャワで開かれる予定になっている。

今回の会議では、開会および閉会の際に、それぞれ二つ  
づつ、1時間の特別講演があり、一般講演は次の4部門に分  
れて行われた。

1. 非線形振動理論の解析的方法
2. 非線形振動理論における定性的方法

3. 非線形振動理論の力学への応用

4. 非線形振動理論の電気工学・電子工学への応用。

講演は特別講演を含めて全部で268件予定されていたが、講演者欠席のため行われなかった講演も若干あった。参加者は17国約450人位で、我が国からは筆者達2人が参加した。つぎの表は講演者数をプログラムにより国および部門毎に分類したものである。

COUNTRIES	SESSIONS					TOTAL
	PLENARY	I	II	III	IV	
USSR	1	50	42	45	38	176
USA	1	7	10	4	3	25
POLAND		3	6	15	1	26
BULGARIA		3				3
RUMANIA		2		1	1	4
FRANCE	1	1	2		1	5
BRITAIN			1			1
BELGIUM		1	2			3
ITALY		1				1
NETHERLAND		2		1		3
E. GERMANY		2	2	4		8

YUGOSLAVIA			1	1	2	4
SENEGAL			1			1
MEXICO			1			1
CONGO				1		1
JAPAN	1	1	2	1	1	6
TOTAL	4	73	70	73	48	268

---

I: Analytical methods of the theory of nonlinear oscillations

II: Qualitative methods in the theory of nonlinear oscillations

III: Application of the theory of nonlinear oscillations to mechanics

IV: Application of the theory of nonlinear oscillations to electrical engineerings and electronics.

---

会議における講演のうち、1時間のもの(○印)、および30分間のものを挙げると、つぎの通りである(他の講演はすべて20分間であった)。

PLENARY SESSIONS :

- Mitropolsky, Yu. A. (USSR) : Averaging method in nonlinear mechanics,
- Vogel, Th. (FRANCE) : Sur les systèmes évolutifs a hérédité non-lineaire,
- Crandall, S. H. (USA) : Some heuristic procedures for analysing random vibration of nonlinear oscillations,

- o Urabe, M. (JAPAN) : Numerical investigation of subharmonic solutions to Duffing's equation.

SECTION I : ANALYTICAL METHODS OF THE THEORY OF NONLINEAR OSCILLATIONS

- o Krasnoselsky, M. A. (USSR) : Functional-analytical methods in the theory of nonlinear oscillations,
- Antosiewicz, H. A. (USA) : A fixed point theorem and the existence of periodic solutions,
- Maezawa, S. (JAPAN) : Superharmonic vibrations in piece-wise linear systems with unsymmetrical characteristics,
- Gikhman, I. I. (USSR) : Statistical theory of nonlinear oscillations with discontinuous trajectories,
- Halanay, A. (ROUMANIA) : Some new results and problems concerning periodic and almost periodic solutions for systems with time lag,
- Borisovich, Yu. G. (USSR) : On the theory of periodic and bounded solutions of differential-difference equations,
- Shimanov, S. N. (USSR) : On the theory of periodic oscillations of quasi-linear nonautonomous systems with periodic time lag,
- Graffi, D. (ITALY) : Sur les méthodes approchées pour résoudre quelques équations non lineaires avec des termes héréditaires,
- o Arnold, V. I. (USSR) : Trivial problems,
- Samojlenko, A. M. (USSR) : Contribution to the perturbation theory of invariant manifolds of dynamical systems,
- Valeev, K. G. (USSR) : Application of the Laplace transform to the investigation of linear systems,
- o Krein, M. G. and Yu. L. Daletsky (USSR) : On some results and problems of stability theory and asymptotic behaviour of solutions of differential

equations in Banach space,

- o Bryuno, A. D. (USSR) : Normal form of nonlinear oscillations,
- Vasiljeva, A. B., V. A. Tupchiev and A. N. Yarkin (USSR) : The periodical solutions of differential systems with a small parameter in the derivatives, close to discontinuous ones,
- Morrison, J. A. (USA) : Application of some averaging schemes to certain nonlinear resonance problems,
- Volosov, V. M. and B. I. Morgunov (USSR) : On resonance phenomena in nonlinear systems with fast and slow motions.

SECTION II : QUALITATIVE METHODS IN THE THEORY OF NONLINEAR OSCILLATIONS

- Leontovich-Andronova, E. A. and L. P. Shilnikov (USSR) : On actual state of theory of bifurcations of dynamical systems,
- Barbashin, E. A. (USSR) : Dynamical systems with cylindric phase space,
- Faure, R. (SENEGAL) : Sur l'existence de cycles pour d'equations differentielles,
- Pliss, V. A. (USSR) : On structure of asymptotically stable invariant sets of periodic and autonomous systems of differential equations,
- o Hayashi, C., Y. Ueda and H. Kawakami (JAPAN) : Periodic solutions of Duffing's equation with reference to doubly asymptotic solutions,
- Cartwright, M. L. (BRITAIN) : Almost periodic solutions of differential equations and their basic frequencies,
- Kukles, I. S. (USSR) : On some problems of theory of nonlinear oscillations,
- Skowronski, J. (POLAND) : An attempt to design qualitative differential games,
- o Aiserman, M. A. (USSR) : Problems of absolute stability in Gurwitz Angle,

- Yakubovich, V. A. (USSR) : The frequency criteria for various qualitative kinds of behaviour of solutions of nonlinear differential equations,
- Blekhman, I. I. and R. F. Nagaev (USSR) : The synchronization of weakly coupled dynamical objects and integral criterion of stability of synchronous motions,
- Lakshmikantham, V. (USA) : Several Liapunov's functions,
- Proskuriakov, A. P. (USSR) : On stability of periodical solutions of quasi-linear autonomous systems with several degrees of freedom,
- o Neumark, Y. I. (USSR) : On one class of dynamical systems,
- Yoshizawa, T. (JAPAN) : The existence of almost periodic solutions of functional-differential equations,
- Markus, L. and K. Meyer (USA) : Translativity properties of generic Hamiltonian systems,
- Anosov, D. V. (USSR) : On certain class of invariant sets of smooth dynamical systems.

SECTION III : APPLICATION OF THE THEORY OF NONLINEAR OSCILLATION TO

MECHANICS

- o Ziemba, S., J. Szadkowski, A. Muszynska, B. Radziszewski and J. Wicher (POLAND) : A survey of some directions and researches in the theory of oscillations,
- Ganiev, R. F. and V. O. Kononenko (USSR) : The nonlinear resonance phenomena in systems of solids having rotating and oscillating components,
- Bogusz, W. (POLAND) : Some applications of nonlinear systems,
- Piszcek, K. (POLAND) : Influence of vibrations on human organism from the point of view of random theory,

- Kopachevsky, N. D. and A. D. Myshkis (USSR) : Oscillations of liquid under conditions of complete or partial imponderability,
- Zerembo, L. K. and V. A. Krasilnikov (USSR) : On experimental study of the interaction of nonlinear waves (elastic waves in solids and capillary waves on liquid surfaces),
- o Kalman, R. (USA) : New algebraic methods in stability theory,
- Veits, V. L., I. I. Vulfson and M. Z. Kolovsky (USSR) : The nonlinear problems of mechanism dynamics,
- Popov, E. P. (USSR) : Many-frequency nonlinear oscillations in systems with backfeed,
- Urazbaev, M. T. (USSR) : On nonlinear problems of the theory of seismic steadfastness, creepingness and cotton-picking machines,
- de Pater, A. D. (NETHERLANDS) : Forced vibrations in vehicles moving along an uneven path.

SECTION IV : APPLICATION OF THE THEORY OF NONLINEAR OSCILLATIONS TO  
ELECTRICAL ENGINEERINGS AND ELECTRONICS

- Akhmanov, S. A. (USSR) : Wave modulation in nonlinear medium and space-time analogies in the theory of nonlinear systems,
- Bogoliubov, V. E. (USSR) : On some specific properties in the behaviour of nonlinear resonance systems,
- Utkin, G. M. (USSR) : Approximation of slowly changing stationary waves in theory of autooscillators with distributed and resonant structure,
- Ghaffari, A. (USA) : On some applications of Bogoliubov-Mitropolsky averaging method in relativistic celestial mechanics,
- Rubanik, V. P. and E. F. Tsarkov (USSR) : An investigation of fluctuations in vacuum-tube oscillator with delayed feedback,

- Koroza, V. I. and V. M. Starzhinsky (USSR) : The parametric resonance in problem of wave propagation in periodic structures,
- Illinova, T. M. and R. V. Khokhlov (USSR) : Nonlinear properties of optical amplifier,
- Netushil, A. V. (USSR) : Autooscillations in systems with negative hysteresis,
- o Rakhimov, G. R. (USSR) : On advance in the study of autooscillatory processes,
- Samoilo, K. A. (USSR) : Method of analysis of one-circuit narrow-bands systems, which are similar to nonlinear conservative ones.

上記の講演のうち、講演者欠席のため、実際には行われなかったものが、二、三あった。

上記の講演題目からもわかるように、トピックスは広汎な範囲にまたがっており、また講演をめぐってな可成り excite した討論も行われ、きわめて有意義な会議であった。