POSTNIKOV, L.V.; LYAPUKHOV, V.Ye.

Design of a transistorized voltage stabilizer. Izv. vys. ucheb.
zav.; radiofiz. 6 no.4:840-847 '63.   (MIRA 16:12)

1. Nauchno-issledovatel'skiy fiziko-tekhnicheskiy institut pri
Gor'kovskom universitete.

1. Lyapundy, B. Eng.

2. USSR (600)

4. Machinery in Industry

7. First completely mechanized plant. Tekh.molod 20 no. 10, 1952

9. <u>Monthly</u> <u>List</u> <u>of</u> <u>Russian</u> <u>Accessions</u>, Library of Congress, <u>February</u> 1953. Unclassified.

LYAPUNOV, A., agronom

What we gained from using microelements and bacterial fertilizers.
Hauka i pered. op v sel'khoz 9 no.5:19-20 My '59.
(MIRA 12:8)

1.Kolkhoz "Belyayevskiy," Gor'kovskaya oblast'.
   (Trace elements) (Soil inoculation)

LYAPUNOV, A. A.

Ob Otkelimosti Analiticheskikh Mnozhestv. DAN, 2 (1934), 276-280
Sur la Separabilite Multiple des ensembles Mesurables E. C. R. Scc. Sci. de Vars.,
28 (1935), 118-119.
Contribution a' L'etude de Separabilite' Multiple. Matem. SB', 1 (43), (1936).
503-510
O Nekotorykh Uniformnykh Analiticheskikh Dopolneniyakh, IAN, Ser. Matem.
(1937), 285-306.
O Podklassakh V-Mnozhestv. IAN, Se . Matem. (1937), 419-426.
O Kratnoy Otdelimosti Dlya (A)-operatsii IAN, Ser. Matem. (1939), 539-552.
O Krainoy Otdelimosti Dlya s-Operatsii. DAN53 (1946), 399-402
SO: MATH

LYAPUNOV, A. A.

Liapounov, A. A. **Séparabilité multiple pour le cas des opérations** δs. C. R. (Doklady) Acad. Sci. URSS (N.S.) 53, 395–398 (1946).

Consider a class Ξ of subsets of an arbitrary set. Let $X_1, X_2, \cdots$ be a sequence of sets of Ξ. If whenever $\prod X_n = 0$ there exists a sequence $\{Y_n\}$ of sets, each of which, together with its complement, belongs to Ξ, such that $X_n \subset Y_n$ and $\prod Y_n = 0$, we say that Ξ satisfies the first condition of multiple separation. If with any sequence $\{X_n\}$ there is associated a sequence of sets $\{Z_n\}$, whose complements belong to Ξ, such that $X_n - \prod_n X_n \subset Z_n$ and $\prod Z_n = 0$ we say that Ξ satisfies the second condition of multiple separation. The concept of multiple separation is due to P. Novikoff [same C. R. (N.S.) 4, (1934 III), 145–148 (1934)]. The author is mainly concerned with the determination of conditions sufficient to ensure the satisfaction of the above conditions for a given class Ξ when the operation of the taking of product is replaced by a δs-operation. The results obtained not only include most of those known on multiple separation but give many new cases, both for separation and nonseparation. *J. Todd* (London).

LYAPUNOV, A.

Liapounoff, A. Sur les fonctions-vecteurs complètement additives. Bull. Acad. Sci. URSS. Sér. Math. [Izvestia Akad. Nauk SSSR] 10, 277-279 (1946). (Russian. French summary)

The present paper is a continuation of an earlier one with the same title [same Bull. 4, 465-478 (1940); these Rev. 2, 315]. For definition of terms we refer to the review of that paper. In the earlier paper it was proved that the set of values of any completely additive vector-function with values in an n-dimensional Euclidean space is convex. In the present paper it is shown that this theorem is no longer true if the value-space is infinite-dimensional, even if compact. This is shown by an example in which the value-space is a compact parallelepiped in l_2.   J. V. Wehausen.

Source: Mathematical Reviews,   Vol 9, No. 3

Lyapunov, A.

Lyapunov, A. On R-sets. Doklady Akad. Nauk SSSR
(N.S.) 58, 1887–1890 (1947). (Russian)
The author presents certain generalizations of the opera-
tion A, and announces theorems concerning the preservation
of measurability and the property of Baire under these
generalized operations. Close connections evidently exist
with work of Kolmogoroff [Kantorovitch and Livenson,
Fund. Math. 20, 54-97 (1933)].   E. Hewitt.

Source: Mathematical Reviews,   Vol 7   No. 7

Mat. Mech. im. Steklov, AS USSR

LYAPUNOV, A. A

Lyapunov, A. A. A new definition of certain classes of sets.
Doklady Akad. Nauk SSSR (N.S.) 59, 847–848 (1948).
(Russian)
The author presents a class of operations on families of
sets, which is not described in detail. He announces that
analytic sets in the line are characterized as the family of
sets obtained from intervals by all possible operations of
this class.   E. Hewitt (Seattle, Wash.).

Source: Mathematical Reviews   Vol 9   No 9

LYAPUNOV, A.A.   DOC PHYSICOMATH SCI

Dissertation: "Concerning Operations Leading to Measureable Multiplicities."

1 Dec 49

Mathematics Inst imeni V.A. Steklov, Acad Sci USSR

SO Vecheryaya Moskva
        Sum 71

LYAPUNOV, A.A

Lyapunov, A. A.   On continuous transformations of A-sets. Izvestiya Akad. Nauk SSSR. Ser. Mat. 13, 61-64 (1949). (Russian)

The following theorems are proved. (1) Let E be an analytic subset of the space I of irrational numbers, and let f be a continuous mapping of E into I. Then, for every $\epsilon > 0$, there exists a closed subset F of E such that $0 \leq \mu(f(E)) - \mu(f(F)) < \epsilon$, where μ is Lebesgue measure, and the mapping f is a homeomorphism on F. (II) If E is an analytic set and f is a continuous mapping of E into I, there exists a set $B \subset E$ of type G_i such that $f(E) - f(B)$ is of first category and f is a homeomorphism on B.

E. Hewitt (Seattle, Wash.).

Mathematical Reviews,   Vol   10 No.

Lyapunov, A. A. *B-functions.* Uspehi Matem. Nauk (N.S.) 5, no. 3(39), 109–119 (1950). (Russian)

Let X be a set and let Y be a topological space. Consider an initial class of functions mapping X into Y, which may be designated either as the 0 or the 1 class of functions. Let α be an ordinal number less than Ω, and suppose that for all $\beta < \alpha$, functions of class β have been defined. Then functions of class α are all pointwise limits of convergent sequences of functions of class less than α. These are Baire functions, and the classes of functions are Baire classes. For $H \subset Y$ let $[f(x)\epsilon H]$ denote the set of points $x\epsilon X$ such that $f(x)\epsilon H$. As H runs through the families of all closed sets and all open sets in Y, the sets $[f(x)\epsilon H]$ describe the Lebesgue sets of the function f. If X is a topological space, Borel sets in X are defined as follows. Let $X = \bigcup_n E_n$, where the sets E_n are open or closed and are pairwise disjoint. All sets obtainable as unions of subsequences of such sequences $\{E_n\}$ are sets of the 1st class. If $\alpha < \Omega$ and all classes of sets with number less than α have been defined, then the class of sets E obtainable in the form $E = \lim_{n\to\infty} E_n$, with E_n of class less than α, is the class of sets α. The union of all these classes is the class of B-sets. [Reviewer's note: Observe the difference between this definition and the usual definition of Borel sets.] A function all of whose Lebesgue sets are B-sets is a B-function. A function $y = f(x)$ such that the set of all $(x, f(x))$ in $X \times Y$ is a B-set in $X \times Y$ is said to be a quasi-B-function.

For the case $X = Y =$ the space of irrational numbers, one takes the class of continuous functions as the initial class of functions, and Lebesgue sets for open-and-closed sets as the sets of class 0. Then the following assertions are true: (I) (Lebesgue) A function $y = f(x)$ is of class α if and only if all of its Lebesgue sets for open-and-closed sets are of class α; (II) (Lebesgue) the class of B-functions is identical with the class of Baire functions; (III) (Luzin) the class of B-functions is identical with the class of quasi-B-functions.

Suppose that X and Y are complete metric spaces with countable bases. Then one may take the functions of class 1 to be the uniform limits of pointwise limits of continuous functions. In this case, a function is of class α if and only if its Lebesgue sets for closed sets are countable intersections of sets of class α. Theorems (II) and (III) above are true without alteration.

It is next shown that separable real Hilbert space admits a one-to-one mapping onto the space of irrational numbers such that the image and inverse image of a B-set of class $\alpha > \omega$ is again a set of the same class. Observations are next made concerning functions $\varphi(x, y) = 0$, where $\varphi(x, y)$ is a real B-function defined on $X \times Y$ (X and Y are complete metric spaces with countable bases). The set of all $x\epsilon X$ for which there is a y such that $\varphi(x, y) = 0$ is always an A-set, and if the set of all such y is countable for every x, then the set of x is a B-set. If the implicit function $\varphi(x, y) = 0$ is single-valued, then it is a B-function. Finally, the author shows that every B-function on a complete metric space is continuous on a G_δ of the 2d category.   *E. Hewitt.*

LYAPUNOV, A.A.

24731.   LYAPUNOV, A.A.   Ob Zffertivnoy Izmerimosti Izvestiya Akad. Nauk. Ssar, Seriya

Matem 1949, NO. 4, S. 357-62 Bibliogar! 5 Nazv.

SO: Letopis' No. 33, 1949

LYAFUNCV A. A..

PA 172740

USSR/Mathematics - Set Theory (Groups)   Sep/Oct 50

"Series of Articles on the Descriptive Theory of Sets,"
A. A. Lyapunov, et al

"Uspekh Matemat Nauk" Vol V, No 5(39), pp 11-119

Subject theory has as object exam of properties of
continuum. Fundamental problems of this theory con-
sist in explanation of which of basic structural prop-
erties of sets are preserved as one goes from simplest
(prime) sets, both open and closed, to new more com-
plicated ones. In particular, theory established gen-
eral criteria which permit one to det magnitude, or
power, of certain sets or to make conclusions on their

172740

USSR/Mathematics - Set Theory (Groups)   Sep/Oct 50
                        (Contd)

dimensionality. Present issue initiates this series
with two articles: B-Sets by Ye. A. Shchel'kov and
A. A. Lyapunov and A-Sets by A. A. Lyapunov and V. A.
Arsenin.

172740

LYAPUNOV, A.A.

Lyapunov, A. A. On the equivalence of families of sets.
Uspehi Matem. Nauk (N.S.) 5, no. 6(40), 143-144 (1950).
(Russian)
[For terminology and notation, see the preceding review.]
It is proved that there exists no family $\mathfrak{M}$ of subsets of R
consisting of c elements such that every family containing
c sets is equivalent to some subfamily of $\mathfrak{M}$.
                                        E. Hewitt (Uppsala).

Source: Mathematical Reviews,   Vol   12 No. 8

LYAPUNOV, A. A.

PA 171T66

USSR/Geophysics - Seismology   Nov/Dec 50

"Frequency of Earthquakes," A. A. Lyapunov, and
S. M. Fandyushina, Geophys Inst, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Geog i Geofiz" Vol XIV,
No 6, pp 547-553

Analyzes time sequence of appearance of earth-
quakes which either had close centra or were
aftershocks of some large earthquake. Es-
tablished there is connection for the 1st; i.e.,
after some earthquake, probability of another

171T66

USSR/Geophysics - Seismology (Contd) Nov/Dec 50

occurring is increased. No such connection ob-
served for 2d type; average frequency of after-
shocks is quite variable. Submitted by Acad
A. N. Kolmogorov 13 May 50.

171T66

Lyapunov, H. H.

Lyapunov, A. A. On choosing from a finite number of distributions. Uspehi Matem. Nauk (N.S.) 6, no. 1(41), 178–186 (1951). (Russian)

Let $F_1, \cdots, F_n$ be probability measures defined on a Borel field of sets of an abstract space X. The author considers the problem of distinguishing which of the n F_i's has produced a sample x. The space X is to be expressed as the union of disjunct sets $E_1, \cdots, E_n$, and the statistical rule is to be adopted that F_i is accepted if $x \epsilon E_i$. The reliability of the rule is defined as $\min_i F_i(E_i)$. Suppose that each F_i is nonatomic and absolutely continuous with respect to every other F_i. Then it is shown that there are sets $E_1, \cdots, E_n$ maximizing the reliability. These sets are unique (neglecting sets of F_k-measure 0) if no two F_i's are proportional on the subsets of a set of positive F_k-measure. In all cases $F_i(E_i)$ is independent of i, and this condition is actually sufficient to determine the E_i's in the following very special case. Let $\phi(x, a)$ be for each a a probability density in the real variable x, and suppose that $(\partial^2/\partial a \partial x) \log \phi(x, a) > 0$. Then for any $a_1 < \cdots < a_n$, if F_i above is identified with the distribution determined by the density with $a = a_i$, and if $E_1, \cdots, E_n$ are as above, $E_1, \cdots, E_n$ are intervals, ordered from left to right. The hypothesis on ϕ is satisfied in many cases, for example if ϕ is the normal density with fixed variance and mean a.   J. L. Doob (Urbana, Ill.).

Source: Mathematical Reviews,   Vol. 12 No. 10

LYAPUNOV, A. A.

USSR/Mathematics - Mathematician   Mar/Apr 52

"Petr Sergeyevich Novikov: On the Occasion of His
50th Birthday," A. A. Lyapunov

"Uspekh Matemat Nauk" Vol VII, No 2 (48), pp 193-196

Novikov's main work has been in the set theory of
modern algebra, sometimes in cooperation with his
students V. Ya. Arsenin, Z. I. Kozlova, and A. A.
Lyapunov. He has also worked in the field of ma-
thematical physics: He established the unique-
ness of solns of the inverse problem in the theory
of potential for the case of star fields, which is
of great significance for theoretical geophysics.

Entered Moscow U in 1922 when N. N. Luzin was head
of the Moscow Theoretical Functional School.
Novikov became one of his most intimate students.

214T60

214T60

LYAPUNOV, A. A., MIGIRENKO, G. S.

Mathematics

Pseudo mathematical "reflections" of Mr. Richardson Priroda 41 no. 5, 1952

<u>Monthly List of Russian Accessions</u>, Library of Congress, August, 1952. UNCLASSIFIED.

LYAPUNOV, A. A., DR PHYS-MATH SCI

USSR/Mathematics - Criticism   May 52

"Concerning Richardson's Pseudomathematical
'Speculations,'" A. A. Lyapunov, Dr Phys-Math
Sci, G. S. Migirenko, Cand Mech Sci

"Priroda" No 5, pp 127,128

Scathing criticism of L. R. Richardson's article
"Can the Armament Race End Without War?" appear-
ing in the English journal "Nature," in which
a simple system of 2 simultaneous linear differ-
ential eqs is established to describe the proc-
esses of an armament race. The reviewers are

230T79

amazed that the editors of "Nature" could admit
such an unscientific article in their journal.
Claim that Richardson's ideas oppose Soviet
knowledge of the causes of war, namely, imperia-
listic aggression of capitalistic countries.

230T79

LYAPUNOV, A. A.

Lyapunov, A. A., On criteria of degeneracy of R-sets.
Izvestiya Akad. Nauk SSSR. Ser. Mat. 17, 563-578
(1953). (Russian)

The paper gives proofs of several propositions some of
which were announced earlier [Doklady Akad. Nauk SSSR
(N.S.) 58, 1887-1890 (1947); these Rev. 9, 339]. It is
especially concerned with the question of finding in what
measure the degeneracy criteria (Suslin, Luzin, etc.) for
A-sets to yield B-sets have analogues for R-sets. Contrary
to what happens with the Suslin criterion, the Luzin
uniqueness criterion is transferable (Th. 4). Therefore, the
"rigid" bases N of δp-operations are studied [according to
Otchan, Mat. Sbornik N.S. 10(52), 151-163 (1942); these
Rev. 7, 8] (N is rigid, provided it contains no two distinct
comparable chains). In §2 one proves that (like A) R^a, R_a^a
are operations definable by means of rigid bases (not so are
lim inf, lim sup), a consequence of which is a form of unique-
ness statement. Given: rigid basis N, the sequence $\{E_n\}_n$
of sets; then a point x is called an N-unique point of $\{E_n\}_n$
if there is a unique chain η of N so that $x \in \bigcap E_n$ ($n \in \eta$).
Here is the analogue of Luzin's uniqueness statement. If
$[N]$ is a rigid basis of R^a, let $\mathcal{E} = \{E_{\alpha_1 \ldots \alpha_k}\}$ be a table or ma-
trix of BR_a-sets (resp. $BR_{a\beta}$-sets); if $U = R_{[N]}(\{E_{\alpha_1 \ldots \alpha_k}\})$
equals the set of the $[N]$-unique points relative to $\mathcal{E}$, then
U is a BR_a-set (resp. $BR_{a\beta}$-set) (Th. 4). The Glivenko im-
bedding theorem [ibid. 36, 138-142 (1929)] is extended as
follows: Under the same suppositions, there exists a set
mapping $\mathcal{E}' = \{H_{\alpha_1 \ldots \alpha_k}\}$ of BR_a-sets (resp. $BR_{a\beta}$-sets) so
that $H_{\alpha_1 \ldots \alpha_k} \supseteq E_{\alpha_1 \ldots \alpha_k}$ and that each point of $R_{[N]}(\mathcal{E}')$ is
an $[N]$-unique point of $\mathcal{E}'$ (Th. 5).   G. Kurepa.

PA 246TC8

LYAPUNOV, A.A.

USSR/Mathematics - Set Theory.   Mar/Apr 53

"Classification of R Sets," A.A. Lyapunov, Moscow

"Matemat Sbornik" Vol 32 (74), No 2, pp 255-262

Continuation of author's previous article "R Sets"
("Trudy Matem In-ta im Steklova," Vol 40 (1953)).
Investigates the structure of the internal classi-
fication of R sets. States that the study of the
various classes of sets that occur in the various
constructions of mathematical analysis, theory of
functions, etc., has given rise to the problem of
the descriptive theory of sets. Submitted 25 Apr
52.

246T88

LYAPUNOV, A. A.

Mathematical Reviews
Vol. 14 No. 11
Dec. 1953
Analysis

Lyapunov, A. A. Separability and nonseparability of R-sets. Mat. Sbornik N.S. 32(74), 515–532 (1953). (Russian)

As sequel to some of his previous papers and in connection with researches of Lusin–Novikov, etc., the author studies the questions of separation of various kinds of sets by means of sets of another kind. As in the particular case of A-sets, one has 2 types of separation: the simple one (Lusin) and the multiple one (Novikov); in each of these cases one has to distinguish 2 types of separation, according as the intersection of the given sets to be separated is void or nonvoid. For example, for the simple separation one has the Lusin principles: (1) disjoint A-sets are B-separable (type 1); (2) if X, Y are A-sets, then $X - X \cap Y$, $Y - X \cap Y$ are separable by B-sets (type 2). The corresponding propositions hold true for what the author calls the ordinary $R_{\mathfrak{A}}$-operations (Theorems 1, 11). [For the terminology and notations one is referred especially to an unavailable paper of the author: Trudy Mat. Inst. Steklov. 40 (1953).] As a corollary to Theorem 11 one has the fact that if $z \in \{A, R_{\alpha}, R_{\alpha\beta}\}$, then any pair of disjoint Z-sets can be separated by means of BZ-sets [cf. Lusin, Leçons sur les ensembles analytiques, Gauthier-Villars, Paris, 1930, p. 210 for $Z = A$]. Let λ be a regular class of transfinite functions and ϕ_N a δ-function such that $\Xi(\lambda)$ is invariant with respect to all δ-functions ϕ_N; then for each sequence $\{E_n\}$ of $\Xi(\lambda)$-sets there exists a sequence $\{H_n\}$ of $C\Xi(\lambda)$-sets satisfying

LYAPUNOV, A.A.

R - sets.   Trudy Mat.inst. 40:3-67 '53.

(MIRA 6:11)
(Aggregates)

LYAPUNOV, A.A., doktor fiziko-matematicheskikh nauk.

First volume of N.N.Luzin's works ("Collected works."
[matematik] N.N.Luzin. Reviewed by A.A.Liapunov). Vest.
AN SSSR 24 no.1:126-127 Ja '54.
(MLRA 7:1)

1. Akademiya nauk SSSR (for Luzin).
    (Luzin, Nikolai Nikolaevich, 1883-1950) (Mathematics)

LYAPUNOV, A. A.

√★ Ljapunow, A. A., Stschegolkow, E. A., und Arsenin, 1 - F/⍵
W. J. Arbeiten zur deskriptiven Mengenlehre. Deut-
scher Verlag der Wissenschaften, Berlin, 1955. iii+
103 pp. DM 15.15.
   Translation of a collection of papers on the descriptive
theory of sets: A. A. Lyapunov, Introduction; E. A.
Stegol'kov, Elements of the theory of B-sets: V. Ya.
Arsenin and A. A. Lyapunov, The theory of A-sets;
A. A. Lyapunov, B-functions (Uspehi Mat. Nauk (N.S.)
5 (1950), no. 5(39), 11–13, 14–44, 45–108, 109–119; MR 12,
597].

Lyapunov, A. A.

44-1-9

TRANSLATION FROM: Referativniy zhurnal, Matematika, 1957, Nr 1, p 1 (USSR)

AUTHORS: Sobolev, S.L., Kitov, A.I., Lyapunov, A.A.

TITLE: The Principal Features of Cybernetics (Ocnovnyye cherty kibernetiki)

PERIODICAL: Vopr. Filosofii, 1955, Nr 4, pp 136-148

ABSTRACT: The article represents the first attempt at a serious study of the scientific content of cybernetics. Cybernetics is defined as a new scientific trend, created by N. Wiener, which is not, however, a sufficiently well-developed and complete scientific discipline. The main divisions of cybernetics, according to the authors, are: (1) information theory; (2) theory of computing machines, as a theory of self-organizing logical processes similar to human thinking; and (3) theory of automatic control systems, which includes the study, from the functional point of view, of the working processes of the nervous system, the sensory organs and other organs of living organisms. Attention is given to the mathematical apparatus of cybernetics, in particular to the study of information, with reference to the work of K. Shannon (collection of translations, "Transmission of Electrical Signals in the Presence of Interference", Moscow, 1953) and A. Ya. Khinchin (Math., 1954, 3771). The necessity of combating foreign reactionary

Card 1/2

The Principal Features of Cybernetics (Cont.)   44-1-9

ideology is noted and at the same time the mistakes of several Soviet
philosophers who did not understand the scientific content of cybernetics
are pointed out. The authors themselves do not give a critique of the
philosophical idealistic concepts connected with the development of
cybernetics.

                                        P.Ye. Sivokon'

Card 2/2

Lyapunov, A.A.

Aleksandrov, P. S., and Lyapunov, A. A. Lyudmila I - F/7
Vsevolodovna Keldyš (on her fiftieth birthday). Uspehi
Mat. Nauk. 10, no. 2(64), 217-223 (1 plate) (1955).
(Russian)
A list of her published papers is included.

LYAPUNOV,A.A., professor; KULAGINA,O.S.

Using calculating machines in translating from one language into
another. Priroda 44 no.8:83-85 Ag '55.   (MIRA 8:10)

1. Matematicheskiy institut imeni V.A.Steklova Akademii nauk SSSR
                      (Translating machines)

$\mathcal{L}y \cap \rho u N \omega v, A.A.$

USSR/Geophysics

Card 1/1   Pub. 22 - 19/59

Authors   : Lyapunov, A. A.

Title   : A criterion for checking the interpretations of gravitational observations

Periodical   : Dok. AN SSSR 102/2, 365-366, May 11, 1955

Abstract   : A method is described for checking the interpretation of observed gravi-
               tational data. It consists in the construction of a certain analogue, the
               quantity of which is similar to the observed data and can easily be cal-
               culated (the final integrals used in the calculations are taken in
               arbitary but limited regions). Four USSR references (1936-1940). Diagrams.

Institution : Acad. of Sc., USSR, Mathematical Institute imeni V. A. Steklov.

Presented by : Academician G. A. Gamburtsov, December 31, 1954

LYAPUNOV, A. A.   A

    Avtomatizatsiya perevoda s odnogo yazyka na drugoy
(by) D.Y. Panov, A.A. Lypunov (i) I.S. Mukhin.
Moskva, Izd-vo Akademii Nauk SSSR, 1956.
    33 p.
    At head of title: Akademiya Nauk SSSR. Sessiya po
Nauchnym Problemam Avtomatizatsii Proizvodstva. Plen-
arnoye Zasedaniye.

LYAPUNOV, A. A., Dr. of Phys. Math. Sci. and YU. I. YANOV, Scientist

"Logical Program Schemes" a paper presented at the Conference on Methods of Development of Soviet Mathematical Machine-Building and Instrument-Building, 12-17 March 1956.

Translation No. 596, 8 Oct 56

LYAPUNOV, A. A.

"Algorithms of the Transformation of Information," a paper presented at the Soviet Conference on Communication Theory, 6-7 Dec 55, Priroda, March 1956

Sum. 916, 3 May 56

L YAPUNOU, A.A.

Transactions of the Third All-union Mathematical Congress, Moscow, Jun-Jul '56,
Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.

Lyapunov, A. A. (Moscow). On Logical Program Charts.   193

LYAPUNOV, A. A., YABLONSKIY, S. V., POLETAYEV, I. A. and KITOV, A. I.

"On Cybernetics," _Trudy tret'yego Vsesoyuznogo matematicheskogo s"yezda_ /Proceedings of the Third All-Union Mathematics Congress/, Vol. II. Brief outline of survey and sectional papers, Publishing House of the Academy of Sciences USSR, Moscow, 1956, Pages 76 - 77.

SOV/169-59-3-2268

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 3, p 30 (USSR)

AUTHOR: Lyapunov, A.A.

TITLE: On the Interference of Seismic Vibrations

PERIODICAL: Sb. posvyashch. pamyati akad. P.P. Lazareva, Moscow, AS USSR,
             1956, pp 363 - 372

ABSTRACT: The article has not been abstracted.

Card 1/1

LYHPUNOV, A. A.

KELDYSH, M.B., akademik; LYAPUNOV, A.A., doktor fiziko-matematicheskikh
nauk; SHURA-BURA, M.R., doktor fiziko-matematicheskikh nauk.

Mathematical problems in the theory of calculating machines.
Vest.AN SSSR 26 no.11:16-37 N '56.   (MLRA 9:12)
          (Electronic calculating machines)

LYAPUNOV, A. A. and SOBOLEV, S. L.

Kibernetika i estestvoznaniye /Cybernetics and Natural Science/, Publishing House of the Academy of Sciences USSR, 1957, 26 pages. (Material for the All-Union Conference on Philosophical Problems of Natural Science).

SOV/112-58-2-2658

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1958, Nr 2, p 137 (USSR)

AUTHOR: Keldysh, M. V., Lyapunov, A. A., and Shura-Bura, M. R.

TITLE: Mathematical Problems of the Theory of Computers
(Matematicheskiye voprosy teorii schetnykh mashin)

PERIODICAL: V sb.: Sessiya AN SSSR po nauchn. probl. abtomatiz proiz-va,
1956. Plenarn. zasedaniya. M., AS USSR, 1957, pp 100-130, discussion
pp 148-161

ABSTRACT: The mathematical, logical, and technical principles of electronic
computers can be used in creating new automatic devices, the functioning of
which can be specified by a definite sequence of logical or arithmetical opera-
tions. From this standpoint, principles of digital and analog computers are
set forth, as well as the mathematical bases of their functioning. Methods for
automatically realizing a number of algorithm-forming processes are con-
sidered: mathematical-problem programming, interlingual translation, data
processing, production-process control, dispatcher control, etc. Some
cybernetics problems are examined, cybernetics being defined as the science
of the creation and structural analysis of algorithms that depicts surrounding
phenomena and the science that describes the algorithms.

SOV/112-58-1-927

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1958, Nr 1, p 135 (USSR)

AUTHOR: Panov, D. Yu., Lyapunov, A. A., and Mukhin, I. S.

TITLE: Automation of Interlingual Translations
(Avtomatizatsiya perevoda s odnogo yazyka na drugoy)

PERIODICAL: V sb.: Sessiya AN SSSR po nauchn. probl. avtomatiz. proiz-va,
1956. Plenarn. zasedaniya, Moscow, AS USSR, 1957, pp 181-213, discussion
p 214.

ABSTRACT: A detailed description is submitted of two methods of translating
foreign languages into Russian, as developed at the Mathematical Institute
imeni Steklov and at the Institute of Fine Mechanics and Computing Techniques.
The first method was programmed for "Strela" computer; the second method
for "BESM" computer. In addition to translations from European languages,
some problems of translation from Chinese and Japanese are also considered,
as well as from one foreign language into another, using Russian as an inter-
mediary language. There are 7 illustrations.

N. Ya. N.

AVAILABLE: Library of Congress

Card 1/1   1. Language   2. Computers--Applications

LYAPUNOV, A.A. (Moscow); SHESTOPAL, G.A. (Moscow)

Elementary information on the solution of problems by electronic calculating machines. Mat. pros. no.1:57-74 '57.   (MIRA 11:7)
(Electronic calculating machines)

LYAPUNOV, A.A. (Moscow); SHESTOPAL, G.A. (Moscow)

Algorithmic description of control processes. Mat. pros.no.2:81-95 '57.
(MIRA 11:7)

(Cybernetics)

LYAPUNOV, A.A. (Moscow)

Real numbers; teaching in institutes of technology with large
mathematics programs. Mat. pros.no.2:149-156 '57.

(MIRA 11:7)

(Numbers, Theory of)

LYAPUNOV, A.A.

Operations with sets permitting transfinite indices. Trudy Mosk.
mat.ob-va 6:195-230 '57.   (MIRA 10:11)
                          (Aggregates)

LYAPUNOV, A.A., professor.

Embryonic cells contain the hereditary information coded by some
microstructures.   Tekh.mol. 25 no.6:8 Je '57.   (MIRA 10:7)
(Heredity)

LYAPUNOV, A. A.

TIMOFEYEV-RESOVSKIY, N.V., professor; LYAPUNOV, A.A., professor.

A common language is needed for mathematicians, physicists, chemists, and biologists.   Tekh.mol. 25 no.6:11 Je '57.

(MLRA 10:7)

(Science)

LYAPUNOV, A.A.; YABLONSKIY, S.V.

An outstanding contribution to mathematics. Priroda 46 no.8:54-56
Ag '57.   (MIRA 10:9)

1. Matematicheskiy institut im. V.A. Steklova Akademii nauk SSSR,
Moskva.
                    (Groups, Theory of)

LYAPUNOV, A. A.

SOBOLEV, S. L. (Acad.) and LYAPUNOV, A. A.   (Prof.)

"Cybernetics and the Natural Sciences."

report presented at All-Union Conference on Phiolosophical Questions of the Natural Sciences. Moscow Scientists Club 22 October 58

LYAPUNOV, A. A. and KULAGINA, O. S.   (Moscow)

"About the Work by Machine Translation of the Mathematics Institute AS SSR"

Theses - Conference on Machine Translations, 15 - 21 May 1958, Moscow.

LYAPUNOV, A.A.

Algorithms for information processing. Izv.vys.ucheb.zav.; radiofiz.
[1] no.1:106-109 '58.   (MIRA 11:11)

1. Matematicheskiy institut imeni V.A. Steklova AN SSSR.
                        (Algorism)

Lyapunov, Aleksey, Andreyevich

PHASE I BOOK EXPLOITATION   SOV/1128

Problemy kibernetiki, vyp. 1 (Problems of Cybernetics, no. 1)
     Moscow, Fizmatgiz, 1958. 268 p. 20,000 copies printed.

Ed. (title page): Lyapunov, Aleksey Andreyevich; Ed. (inside book):
     Smolyanskiy, M.L.; Tech. Ed.: Kolesnikova, A.P.; Eds. and Com-
     pilers: Lupanov, O.B., Pil'chak, B.Yu., Kulagina, O.S.,
     Yablonskiy, S.V.

PURPOSE: The book is intended to relate the interests of scientific
     and engineering personnel whose work involves various aspects of
     cybernetics.

COVERAGE: This collection of articles deals with general problems of
     cybernetics, information theory, theory of algorithms and automatic
     machines, theory of control systems, theory of games and tactics,
     methods of operations analysis, problems in the theory of cal-
     culating machines, programming, and the application of cybernetics
     to other sciences, such as biology, economics and linguistics.
     "Problems of Cybernetics", as a recurrent publication, will continue
     to include original papers, survey articles and translations and,

Card 1/4

Problems of Cybernetics, no. 1   SOV/1128

like the present work, will contain the results of seminars in
cybernetics held at Moscow University. There are 107 references,
of which 104 are Soviet, 2 English and 1 Hungarian.

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IV.   PROBLEMS OF MATHEMATICAL LINGUISTICS

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Problems of Cybernetics, no. 1   SOV/1128

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    on the Basis of the Theory of Sets   203

Moloshnaya, T.N.   Discrimination of Homonyms in the Machine
    Translation of English to Russian   215

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AVAILABLE: Library of Congress

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                                          2-24-59

Card 4/4

LYAPUNOV, A. A.

"On Cybernetics" (21 September 1956).

Paper presented at the Seminars on Cybernetics at Moscow University during the 1956-57 school year.

Problemy Kibernetiki, No. 1, 1958

LYAPUNOV, A. A.

"On the Fundamental Problems of Cybernetics" (10 October 1955);
"Algorithmic Scheme of the Elementary Mechanism of Thinking" (14 November 1955);
"The Concept of Probabilist Processes. Simulation of the Production of
Conditioned Reflexes in the Form of a Markov Process" (12 December 1955);
"Relationships Between Discrete and Continuous Processes in Biological
Processes" (13 February 1956); "Cybernetic Problems of Genetics" (12 March 1956);
" Directed and Random Component Motion of Living Beings (on the Works of
N. I. Kobzev)" (2 April 1956); "Random Occurrences, Values, and Processes and
Certain Biological Processes Connected with Them" (16 April 1956); "On Some
Statistical Problems of Cybernetics and Biology" (7 May 1956).

Paper presented at the Seminars on Cybernetics at Moscow University during
the 1955-56 school year.

So: Problemy Kibernetiki, No. 1, 1958, pp. 265-66

LYAPUNOV, A. A.

"On a Theoretical-Information Approach to the Fundamentals of Genetics"
(29 February 1957).

Paper presented at the Seminars on Cybernetics at Moscow University during
the 1956-57 school year.

Problemy Kibernetiki, No. 1, 1958

66526

SOV/112-59-18-38686

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, Nr 18, p 100. (USSR)

AUTHOR: Lyapunov, A. A.

TITLE: On Logical Programming Schemes

PERIODICAL: V sb.: Probl. kibernetiki. Nr 1, Moscow, Gos. izd-vo fiz.-matem. lit., 1958, pp 46 - 74

ABSTRACT: The logical principles of the programming of problems for their solution by high-speed digital computers are investigated. General information on programming is given. Some hypothetical conditional conditional computer (CC) and some simple programs, made suitable for this conditional computer, are described. The conception of the computing scheme is introduced, by which the product of operators and logical conditions is understood. Each operator performs one of the stages in the treatment of information, the initial algorithm can be divided into. The logical conditions are destined for the determination of the order of performance of the operators, which are not always predetermined and change according to the results obtained in the course of the work of other operators. The product of the operators is called their subsequent performance. As examples the computation schemes are given

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On Logical Programming Scheme

SOV/112-59-18-30606

for the algorithm of building consecutive squares of natural numbers, squares of even numbers only and products ot two square matrices. The difference between the computation scheme and the programming scheme (PS) is pointed out. While the former deals with operators in an abstract sense the PS deals with programs which carry out these operators. The PS for the solution of various problems is called the product of the programming performance of the operators and of logical conditions. In order to pass over from the computation scheme to the PS, it is necessary to add control operators, which prepare the memory device to carry out next computing operators and the logical conditions, the verification of which warrants the required sequence of the computing operators. The following types of control operators are distinguished: re-addressing, re-storation, formation, change of parameter, transfer, switching over of the logical conditions, input of parameters. Their determination and examples of application in the PS are given. The possibility of an equivalent transformation of the PS for the solution of definite problems is pointed out and by this the search of a rational program. Examples of essential transformation of the PS are examined, which consider the individual peculiarities of the problem to be solved, in contrast to formally identical transformations of algorithms. As a particular example the solution of the Dirichlet problem on the square by the method of iterations with the concentration of the network is cited. The method of logical scales

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On Logical Programming Scheme

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SOV/112-59-18-38635

for problem programming is described, in which a certain logical condition has different meanings at different stages of computation. Cases may happen when the course of solving a problem is controlled by several logical conditions and the order of computation depends on some function of these conditions. Two different methods of programming with the aid of functional logical scales are recommended.

E.A.G

Reference: Referativnyy zhurnal, Elektrotekhnika, 1957, abstract Nr 21370.

Card 3/3

LYAPUNOV, A. A.

"Cybernetics and Its Future," Moskovskiy propagandist /Moscow Propagandist/, 1958, No. 1, Pages 69 - 73.

06520   SOV/141-58-1-10/14

AUTHOR: Lyapunov, A. A.

TITLE: Algorithms for the Processing of Information

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika,
        1958, Nr 1, pp 106-109 (USSR)

ABSTRACT: The problem of information   handling requires a set of
        rules for the processing of all possible messages which form
        the information. The rules should provide the possibility
        of solving various types of problems. Normally, the rules
        of information processing, referred to as the information
        processing algorithms, are in the form of a set of orders
        which permit the processing of certain types of messages;
        further, certain conditions are implied which determine the
        order in which the rules are applied to the processed message.
        The article aims at expounding a method of setting up the
        algorithms which would be suitable for programming a computer.
        The method is used in the programming of various arithmetical
        problems as well as the programming of non-arithmetical algo-
        rithms. An algorithm is split into a number of elementary

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Algorithms for the Processing of Information

acts, each of which is performed in accordance with a pre-
determined simple rule. The elementary acts will be denoted
by Latin capitals with subscripts which denote the para-
meters on which a given act depends. These acts are referred
to as the elementary operators. The logical conditions will
be denoted by small Latin letters. Each logical condition
is followed by an arrow which denotes the direction of the
transition if the condition is not fulfilled. A process can
be synthesized by using simple operators and logical condit-
ions. Thus, for example, an operator:

$$A_p \overset{\rceil}{|} \, BC \overset{\downarrow}{}$$

is ABC for p = 1 and A for p = 0 . If the logical
condition consists of checking a certain equality or in-
equality, the expression to be checked is in the form of an
argument. This is expressed in the form of:

$$\overset{\downarrow}{|}\overline{A_i \cdot p(i > n)}\overset{\rceil}{|} = A_1 \cdot A_2 \cdot \ \ldots \ \cdot A_n \cdot$$

The system of constructing the algorithms is illustrated by
Card 2/4   an example. A system of linear algebraic equations, repres-

06520   SOV/141-58-1-10/14

Algorithms for the Processing of Information

    ented by the first equation on p 108, is to be transformed
    into the diagonal form without selecting the main elements.
    The computing code can be represented by the second equation
    on p 108, where the symbol

$$\prod_{i=1}^{n}$$

    denotes the multiplication of the operators in the order of
    increasing parameters from $i = 1$ to $i = n$. The programme
    scheme can be written as the last equation on p 108, where
    $F(i)$ denotes the operator which increases the parameter i

    by a unit, while $\{1 \to i\}$ is an operator substituting unity

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06520   S OV/141-58-1-10/14

Algorithms for the Processing of Information

     instead of the parameter l . The paper contains 7 Soviet
     references.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova AN SSSR
     (Mathematical Institute im. V. A. Steklov, Academy of
    Sciences, USSR)

SUBMITTED: June 27, 1957.

Card 4/4

ZALGALLER, S.I. (Leningrad); SKOPETS, Z.A. (Yaroslavl'); ROFE-BEKETOV, F.S.
    (Khar'kov); LANDIS, Ye.M. (Moskva); LEVIN, V.I. (Moskva); STECHKIN,
    S.B. (Moskva); LYAPUNOV, A.A. (Moskva); ARNOL'D, V.I. (Moskva);
    LOPSHITS, A.M. (Moskva)

    Problems of higher mathematics. Mat.pros. no.3:270-274 '58.
                                                        (MIRA 11:9)
                (Mathematics--Problems, exercises, etc.)

LYAPUNOV, A. A. and SOBOLEV, S. L.

"Cybernetics and Natural Science," Voprosy filosofii /Problems of Philosophy/, 1958, No. 5, Pages 127 - 138.

AUTHOR: Lyapunov, A.A.   SOV/140-58-5-14/14

TITLE: On Mathematical Problems of Cybernetics (O matematicheskikh
              problemakh kibernetiki)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika,1958, Nr 5,
              pp 166-174 (USSR)

ABSTRACT: The paper gives a survey beginning with the possible definitions
              of the notion of cybernetics and then essentially deals with
              the Russian contributions to the theory of algorithms and to
              the information theory. As the central problem of cybernetics
              the author considers the construction of the theory of the
              most general control and regulation schemes.
              There are 41 references, 34 of which are Soviet, and 7 American.

ASSOCIATION: Matematicheskiy institut imeni V.A.Steklova AN SSSR
              (Mathematical Institute imeni V.A.Steklov, AS USSR)

SUBMITTED: November 27, 1957 (Date of Lecture, Leningrad)

Card 1/1

Lyapunov, A A

PHASE I BOOK EXPLOITATION   SOV/3493

Vseoyuznoye soveshchaniye po filosofskim voprosam yestestvoznaniya

Filosofskiye problemy sovremennogo yestestvoznaniya; trudy soveshchaniya...(Philosophic Problems of Modern Natural Science; Transactions of the All-Union Conference on Philosophic Problems of Natural Science) Moscow, Izd-vo AN SSSR, 1959. 663 p. Errata slip inserted. 6,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR.

Ed. of Publishing House: A.I. Kompaneyets; Tech. Ed.: I.N. Dorokhina; Editorial Committee: P.N. Fedoseyev, Corresponding Member, Academy of Sciences USSR (Chairman), B.M. Vul, Corresponding Member, Academy of Sciences USSR, M.E. Omel'yanovskiy, Academician, Academy of Sciences UkrSSR, N.M. Sisakyan, Corresponding Member, Academy of Sciences USSR, V.N. Stoletov, Professor, and Ye.N. Chesnokov, Candidate of Philosophical Sciences (Scientific Secretary)

PURPOSE: This book is intended for natural scientists and philosophers who are interested in coordinating Communist philosophy with science.

COVERAGE: This is a publication of the transactions of the All-Union Conference on Philosophic Problems of Natural Science which took place in Moscow, October 21-25, 1958. The Conference was attended by 20 academicians and 30 corresponding members of the Academy of Sciences USSR, 15 academicians and 34 members of republic and special academies, 186 university and college workers, 240 workers of scientific research institutes, and 75 party officials. The purpose of the Conference, as expressed by the Chairman of the Organization Committee, K.V. Ostrovityanov, was to unite the efforts of Soviet philosophers and scientists in the dialectical-materialistic interpretation of the achievements of modern science, and to provide the philosophical background required for the study of modern scientific problems.

Card 4/11

Lyapunov, A.A.

Matematika v SSSR za sorok let, 1917-1957.tom l: Obzornye stat'i (Mathematics in the USSR for Forty Years, 1917-1957).Vol l: Review Articles) Moscow, Fizmatgiz, 1959. 1002 p. 5,500 copies printed.

Eds: A. G. Kurosh, (Chief Ed.), V. I. Bityutskov, V. G. Boltyanskiy, Ye. B. Dynkin, O. Ye. Shilova, and A. P. Yushkevich; Ed. (Inside book): A. P. Lapko; Tech. Ed.: S. N. Akhlamov.

PURPOSE: This book is intended for mathematicians and historians of mathematics interested in Soviet contributions to the field.

COVERAGE: This book is Volume I of a major 2-volume work on the history of Soviet mathematics. Volume I surveys the chief contributions made by Soviet mathematicians during the period 1947-1957; Volume II will contain a bibliography of major works since 1917 and biographic sketches of some of the leading mathematicians. This work follows the tradition set by two earlier works: Matematika v SSSR za pyatnadtsat' let (Mathematics in the USSR for 15 Years) and Matematika v SSSR za tridtsat' let (Mathematics in the USSR for 30 Years). The book is divided into the major divisions of the field, i.e., algebra, topology, theory of probabilities, functional analysis, etc., and contributions and outstanding problems in each discussed. A listing of some 1400 Soviet mathematicians is included with references to their contributions in the field.

LYAPUNOV, A.A.

Role of mathematics in secondary education. Mat. pros.   no.4:153-154
'59.   (MIRA 12:11)

(Mathematics--Study and teaching)

Lyapunov, A. A.

Card 1/3

SOV/30-60-4-6/12

AUTHOR: None Given

TITLE: All-Union Conference on Philosophic Problems of Modern Natural Science (Vsesoyuznoye soveshchaniye po filosofskim voprosam sovremennogo yestestvoznaniya) By the Editor (Ot redaktsii)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 68, Nr 4, pp 717-727 (USSR)

ABSTRACT: The above conference took place at Moscow in October 1958; it was attended by more than 600 scientists, among them 20 Academicians and 30 Corresponding Members, AS USSR, as well as by delegates from Bulgaria, Hungary, East Germany, and Czechoslovakia. The following lectures delivered at the conference are listed: Academician M. E. Mitin (on Lenin's book "Materialism and Empiriocriticism"), Academician AS UkrSSR K. K. Omel'yanovskiy ("V.-I. Lenin and the Philosophical Problems of Modern Critics"), Doctor of Philosophical Sciences B. M. Kedrov ("On the Relationship of the Forms of Motion of Matter in Nature"), Academician V. A. Fok ("Interpretation of Quantum Mechanics" - already published in Uspekhi fizicheskikh nauk, 1957, Vol 62, Nr 4), Corresponding Member AS USSR L. B. Aleksandrov ("The Philosophical Content of and the

Card 2/3

Significance of the Theory of Relativity"), Academician V. A. Ambartsumyan ("Some Methodological Problems of Cosmogony", Academician S. L. Sobolev and Professor A. A. Lyapunov ("Cybernetics and Natural Science"), Corresponding Member AN USSR G. M. Frank and Academician V. A. Engel'gardt ("On the Part Played by Physics and Chemistry in the Investigation of Biological Problems"), Academician A. I. Oparin ("The Problem of the Origin of Life in the Light of the Progress Made by Modern Natural Science"), and, finally, Corresponding Member AS USSR E. A. Grashchenkov ("Lenin's Theory of Reflection and the Modern Physiology of the Sensory Organs"). About 50 delegates took part in the discussion of these lectures. Next, the introductory speech delivered by the President of the AS USSR, Academician A. N. Nesmeyanov, is reproduced, and the AS USSR, Academician A. N. Nesmeyanov, is reproduced, and so is the closing speech by Corresponding Member AS USSR P. N. Fedoseyev, and finally a resolution passed by the All-Union Conference on philosophical problems of modern natural science is given under the title "On the Tasks of dealing with Philosophical Problems of Natural Sciences". The resolution essentially contains an appeal for the

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investigation of all new scientific facts in the sense of the theory of Marx and Lenin and of dialectic materialism for the adaptation of ideas to the resolution of the 20th Party Congress, cooperation of institutes, coordination of research work, as well as some problems of organization. In conclusion, a list of printed works is given, in which the lectures delivered during the conference were published. There are 8 Soviet references.

LYAPUNOV, A. A.   and BERG, A. M.

"Prospects for the use of electronic computers in the State apparatus."

report submitted for the Soviet Conference on Problems in the Application
of Mathematical Methods in Economic Research, Leningrad, 18-21 January 1960

LYAPUNOV, A.A. (Moskva)

Fundamentals and style of present day mathematics (with reference
to the article of N. Bourbaki. Mat. pros. no.5:113-115 '60.
(MIRA 13:12)

(Mathematics)   (Bourbaki, N.)

LYAPUNOV A. A. and FINKEL'SHTEYN, Yu, Yu.

"On the Formulation of the Behavior of a Group of Automatic Devices."

Report submitted for the Symposium on Principles in the Design of Self-Learning Systems, Kiev Ukr SSR, 5-9 May 1961

LYAPUNOV, A. A. and MALENKOV, A. G.

"Logical Analysis of Concepts and Methods of Genetics" (27 November, 11 December 1959)

report delivered at a seminar on cybernetics, Moscow State University

So: Problemy kibernetiki, Issue 5, 1961, pp. 289-294

LYAPUNOV, A. A. and MALENKOV, A. G.

    "On the Systematization of the Main Concepts of Genetics"

presented at the All-Union Conference on Computational Mathematics and
Computational Techniques, Moscow, 16-28 November 1961

So: Problemy kibernetiki, Issue 5, 1961, pp 289-294

LYAPUNOV, A. A. (Prof.) and BERG, A. I.

"On Prospects of Utilization of Computers in the Government Organization"

presented at the All-Union Conference on Computational Mathematics and
Computational Techniques, Moscow, 16-28 November 1961

So: Problemy kibernetiki, Issue 5, 1961, pp 289-294

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$s/044/62/000/011/064/064$
A060/A000

AUTHORS: Bagrinovskaya, G. P., Kulagina, O. S., Lyapunov, A. A., Moloshnaya,
T. N.

TITLE: Some problems in mathematical linguistics arising in connection
with machine translation

PERIODICAL: Referativnyy zhurnal, Matematika, no. 11, 1962, 88, abstract 11V501
(In collection: "Mash. perev. i prikl. lingvistika". no. 6, Mos-
cow, 1961, 19 - 38)

TEXT: In this report, given at the Conference on mathematical linguistics
in Leningrad in 1959, the possibilities are considered of a further development
of the ideas of A. A. Lyapunov and O. S. Kulagina, formulated in O. S. Kulagina's
paper "On a method of defining grammatical notions on the basis of the theory of
sets" ("Problemy kibernetiki", Moscow, 1958, no. 1). It is proposed to distin-
guish three forms of information characterizing a sentence: a) indication of
the context to which every word belongs (lexical information); b) indication of
the families to which every word belongs (morphological information); c) indi-
cation of the configuration (syntactic information). The syntactic information

Card 1/2

Some problems in mathematical...

S/044/62/000/011/064/064
A060/A000

consists in indicating the number of the vertex in the sentence tree, where every tree is considered as a subset of the universal Cantor tree. The latter assumption is verified by the two-term character of the majority of configurations in natural languages. A method is also indicated for describing the syntactic information by constructing the universal graph of families of the language, where pairs entering in the same configuration are considered as connected. It is claimed that it is necessary to couple the set-theoretic modelling of a language with the information-theoretic approach and then one will learn to estimate precisely the degree of approximation of the abstract model to the real language, and in this connection to establish statistically the fundamental (in contrast to the "non-fundamental") characteristics of the language. It is indicated that the solution of all these problems connected with machine translation may promote the development of the still inexistent theory of algorithms with ratings. In conclusion certain general considerations are presented as to the method of constructing translation algorithms, the employment of mathematicians and linguists, and the preparation of cadres in that domain.

[Abstracter's note: Complete translation]
Card 2/2

I. I. Revzin

S/044/62/000/005/055/072
C111/C444

AUTHORS: Lyapunov, A. A., Kitov, A. I.

TITLE: Cybernetic in technics and economics

PERIODICAL: Referativnyy zhurnal, Matematika, no. 5, 1962, 55-56,
              abstract 5V300. ("Vopr. filosofii," 1961, no. 9, 79-88,
              185)

TEXT: One points to two domains of application of the cybernetic
in technics: the automation of controlling machines and of their complexes
the carrying-out of complicated calculations and modellings of dynamic
and logical systems and processes. The significance of bionic is explained.
Two types of economic problems are mentioned for the solution of which
electronic computing machines can be used: the developing of models of
economic systems and the solution of planing economic problems of
optimization. At last one discusses the question of a uniform system of
public computing centres and the problem of a rational use of the
electronic technic of computing.

[Abstracter's note: Complete translation.]

Card 1/1

LYAPUNOV, A. A.

LAPUNOW, A. A.; SZESTOPAL, G. A. (Moskwa)

An algorismic interpretation of control processes. Rocz wiad matem 4 no.2:187-202 '61.

(Automatic control)   (Railroads)

LYAPUNOV, A.A., red.; LUPANOV, O.B., red.; RIKKO, N.N., red.;
MOSKATOV, G.K., red.; IOVLEVA, N.A., tekhn. red.

[Collection of translations on cybernetics]Kiberneticheskii
sbornik; sbornk perevodov. Moskva, Izd-vo inostr. lit-ry.
No.4. 1962. 255 p.   (MIRA 16:4)
                        (Cybernetics)

S/582/62/000/008/009/013
D405/D301

AUTHOR: Lyapunov, A. A. (Novosibirsk)

TITLE: On algebraic treatment of programming

SOURCE: Problemy kibernetiki. no. 8. Moscow, 1962, 235-241

TEXT: An attempt is made at ascertaining the connection between the basic concepts of programming and the theory of categories. Various concepts are defined (used elsewhere in same source: pp. 191-200, 201-209, 211-233). A memory is defined as the set $\Omega = \{x\}$ of elements called cells. G is the set of elements called states of cells. The mapping of Ω on G is called memory state. A mapping A(f) of one set of possible memory states f onto another is called an operator over Ω. The operators over Ω form a category. A mapping p(f) of a set of possible memory states onto a set U of arbitrary elements is called predicate over Ω; p(f)-composition of a system of operators A^u is defined as $B(f) = A^u(f)$ for p(f) = u. Other definitions refer to subordination of classes, equivalence, algebra of sets generated by a class, and re-addressing operators.

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Further, the control memory Ω^1 is considered, which serves for storing the logical schemes over Ω. A logical scheme is defined as the system of terms $\alpha_1, \alpha_2, \ldots, \alpha_k$. The terms are ordered pairs (A, m) consisting of an operator A and a natural number m, or ordered pairs consisting of a predicate p(f) and a function m(u); the terms can also be classes of functions M which map the set U onto the sequence of natural numbers. A logical scheme defines an operator over Ω.

SUBMITTED: February 23, 1961

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S/582/62/000/008/011/013
D405/D301

AUTHORS: Lyapunov, A. A. and Malenkov, A. G. (Novosibirsk)

TITLE: Logical analysis of the structure of hereditary infor-
             mation

SOURCE: Problemy kibernetiki. no. 8. Moscow, 1962, 293-308

TEXT: The structure of hereditary information is studied with a
view to comparing it with the structures, examined in cytology,
which are the material carriers of this information, i.e. with the
chromosomes. The discrete part of hereditary information is singled
out and its structure is analyzed. The basic concepts are expressed
in axiomatic form, summing up vast experimental material. The sta-
tical properties of the object are expressed as postulates. The
elementary biological processes are formulated as laws. All the
laws and postulates enunciated are valid only with sufficiently
high probability. Their violation is called mutation. The appear-
ance of mutations in biological acts represents errors in the
transmission of information. The external factors responsible for

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the mutations represent the noise background. The phenomena are studied according to their degree of probability; only phenomena whose probability is almost one or far from both one and zero are studied. The present work does not list new facts, it only system-izes the already known from the point of view of information theory. The method proposed is of interest since it enables one to judge to what extent the structural details of hereditary information and of the chromosome apparatus correspond to each other. The structure of the hereditary information is compared with the data of cytology as follows: 1) The discrete part of hereditary information, con-sisting of a finite number of genes, is examined. 2) The require-ments towards the structure of the material carriers of hereditary information are formulated. 3) The structure of the chromosomes is tested from the point of view of these requirements. Conclusion: Chromosome structure corresponds in great detail to the structure of hereditary information.

SUBMITTED: May 12, 1960 (initially)
February 3, 1961 (final version)

Card 2/2

BUDKER, A.M.; LYAPUHOV, A.A., prof.; LAVRENT'YEV, M.A., akademik; VEKUA, I.N., akademik; MIGIRENKO, G.S., prof.; ZHURAVLEV, Yu.I., kand.fiziko-maten. nauk

Birth of a new method for the training of young scientists. Tekh.mol. 30 no.11:14-17 '62.   (MIRA 16:9)

1. Chlen-korrespondent AN SSSR (for Budker). 2. Predsedatel' Sibirs-kogo otdeleniya AN SSSR (for Lavrent'yev). 3. Rektor Novosibirskogo universiteta (for Vekua). 4. Sekretar' partiynogo komiteta Sibirs-kogo otdeleniya AN SSSR (for Migirenko). 5. Chlen TSentral'nogo komi-teta Vsesoyuznogo Leninskogo Kommunisticheskogo soyuza moledezhi (for Zhuravlev).

(Science—Study and teaching)
(Siberia—Academy of Sciences of the U.S.S.R.)

SOBOLEV, S.L.; LYAPUNOV, A.A.

Mathematical problems in modern cybernetics. Izv. Sib. otd. AN SSSR
no.5:3-13 '62.   (MIRA 18:2)

LYAPUNOV, A.A. (Novosibirsk); YABLONSKIY, S.V. (Moskva)

Theoretical problems of cybernetics. Probl. kib. no.9:5-22 '63.
(MIRA 17:10)

ACCESSION NR: AT4016491.   S/2582/63/000/010/0179/0193

AUTHOR: Lyapunov, A. A. (Novosibirsk)

TITLE: The control system of living nature and the general concept of vital processes

SOURCE: Problemy* kibernetiki, no. 10, 1963, 179-193

TOPIC TAGS: cybernetics, control system, theoretical biology, living control system, homeostasis, mathematical model, structural control, statistical control

ABSTRACT: The purpose of the present article (read on June 2, 1962 at a conference dealing with philosophical problems of cybernetics in Moscow) is to propose a cybernetic approach to the study of the phenomena of life. In his introductory statement, the author notes that the physico-chemical trend in biology is aimed at uncovering the elementary vital processes and studying them from the physico-chemical point of view, while the cybernetic trend is directed at the elaboration of a general concept of vital phenomena, based on representations of the structure of organisms and of the elementary processes of life. The belief is advanced that a synthesis of these two directions will result in the creation of a unified system of theoretical biology. The opening sections of the paper are devoted to a delineation of the material covered, the precise statement or formulation of the

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problem and the derivation of the basic definitions. A distinction is drawn between
empirical, theoretical and mathematical natural science. The cybernetic approach
adopted by the author involves the study of the control systems of living nature
and of the control process of vital activity. This approach, together with others
(the biochemical or bioenergetic, for example), will permit the construction of
mathematical models of living phenomena. The author therefore makes use of the
system of precise concepts accepted in cybernetics and employs such notions as in-
formation, control system, signal, elementary act and communication channel in his
treatment of the problem. The various states of matter are considered, along with
those branches of natural science which deal with the study of these states. For
the description of the particular state of matter, the author makes a selection of
spatial and time scalar units and a certain set of physicochemical characteristics,
paying special attention to the mean values and dispersion of the characteristics
selected. The importance of the concept of stability is discussed, along with the
notion of the "accompanying reaction". The author states: "Life may be charac-
terized as a highly stable state of matter which makes use, for the purpose of
giving rise to accompanying reactions, of information coded by the states of the
individual molecules." In the second chapter of the report this definition of life
is analyzed and the energetic cause of the relative stability of living organisms
is investigated. Two fundamentally different methods of forming a higher control
level are distinguished: the structural and the statistic. Some circumstances are
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considered which are, strictly speaking, beyond the sphere of biology and link that
science with sociology. The evolution of the control systems is analyzed, with
special attention to the problem of the differentiation of forms. In the third and
final chapter, the author attempts to compare his definition of life with certain
empirical data derived from biology and collects a number of well-known biological
facts which tend to support, to one degree or another, the concepts advanced in the
first two chapters of the paper. The processes of vital activity are considered,
in this connection, on different levels: the molecular-biological, the cellular,
the organismic, the populational and the evolutionary. The article closes with a
brief discussion of certain possible trends in the practical utilization of know-
ledge accumulated with respect to the control systems of living nature.

ASSOCIATION: none

SUBMITTED: 28Apr62   DATE ACQ: 20Feb64   ENCL: 00

SUB CODE: LS, IE   NO REF SOV: 000   OTHER: 000

Card 3/3

LIAPUNOV, A. A. [Lyapunov, A. A.]; IAblonski, S. V. [Yablonskiy,
        S. V.]

    Theoretical problems of cybernetics. Fiz mat spisanie
    BAN 6 no. 3:180-198 '63.

LYAPUNOV, A.A. (Novosibirsk)

Totally additive vector functions. Part 3: A problem of
IU. Ch. Neiman. ... ... Probl. kib. no.12:165-168 '64.

Totally additive vector functions. Part 4. Ibid.:169-179
(MIRA 18:6)

GLUSHKOV, V.M., otv. red.; KUKHTENKO, A.I., zam. otv. red.;
BLAGOVESHCHANSKIY, Yu.V.. red.; DORODNITSYN, A.A., red.;
YERSHOV, A.P., red.; LYAPUNOV, A.A., red.; MOSKALEV,
I.S., red.; PUKHOV, G.Ye., red.; ROSTUNOV, T.I., red.;
SAMOKHVALOV, K.G., red.; STOGNIY, A.A., red.; TIMOFEYEV,
B.B., red.; SHCHERBAN', A.N., red.; LETICHEVSKIY, A.A.,
red.; KAPITONOVA, Yu.V., red.; MEL'NIK, T.S., red.

[Problems of theoretical cybernetics] Voprosy teoretiche-
skoi kibernetiki. Kiev, Naukova dumka, 1965. 209 p.
                                        (MIRA 18:9)
1. Akademiya nauk URSR, Kiev.

ACC NR: AT6033084   SOURCE CODE: UR/2582/66/000/016/0147/0169

AUTHOR: Kulagina, O. S. (Moscow); Lyapunov, A. A. (Novosibirsk)

ORG: none

TITLE: On the problem of modeling an evolutionary process

SOURCE: Problemy kibernetiki, no. 16. Moscow, 1966, 147-169

TOPIC TAGS: mathematic model, genetics, biologic reproduction, binary code

ABSTRACT: A mathematical model of the evolution of a population of individuals, each with a different genotype, is described. The genotype is considered to be a set of genes each of which has two alleles, 1 and 0, i.e. the genotype is coded as a cortege of n digits with the values 0 and 1. A discrete space of genotypes is considered. The individuals in the population are numbered. Reproduction consists in the selection of pairs of individuals from the numbered set, following a specific numerical sequence, production of offspring, deletion of parents and the insertion of offspring in the vacancies thus formed or, if no vacancies are left, addition of offspring to the tag-end of the population. The complete cycle of the succession of generations is divided into the following stages: formation of parent pairs, formation

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ACC NR: AT6033084

of gametes, formation of zygotes, elimination of lethal genes, development of adults. This model can be used to investigate the effect of various mechanisms of selection in the course of evolution as a function of the degree of panmixia of the original population. Orig. art. has: 4 tables, 8 figures.

SUB CODE: 06, 12 / SUBM DATE: 30Jan65/ ORIG REF: 013

Card 2/2

VOL'PIN, P.I.; DEM'YANENKO, A.I.; LYAPUNOV, A.I.

    Battery of continuously operating digesters with air blast
    agitation. TSvet. met. 35 no.9:86-89 S '62.   (MIRA 16:1)
        (Aluminum--Metallurgy) (Hydrometallurgy)

LYAPUNOV, Aleksandr Mikhaylovich, akademik [deceased]; STETENSKIY, L.N., otv. red. toma

[Collected works in five volumes] Sobranie sochineni: v piati tomakh). Moskva, Nauka. Vol.5. 1965. 494 p.

(MIRA 18:3)