BESKROVNYY, L.G., doktor istor.nauk; LYUSHKOVSKIY, M.V.; SOT, R.Sh.; LUPACH, V.S., red.; SLEPTSOVA, Ye.M., tekhn.red.

[Russian military theory in the 19th and the beginning of the 20th century] Russkaia voenno-teoreticheskaia mysl' XIX i nachala XX vekov. Moskva, Voen.izd-vo M-va obor.SSSR, 1960. 757 p. (MIRA 14:4)

(Military art and science)

LYUSHKOVSKIY, N.V.

KOVAL'CHUK, V.M., polkovnik; NOSOV, F.V., doktor istoricheskikh nauk, kapitan 1 ranga, redaktor; GRASS, I.P., mayor, redaktor; VOROB'YEV, P.V., kapitan 3 ranga; ZEHLIN, N.N., podpolkovnik; MORDVINOV, R.N., kandidat voenno-morskikh nauk, kapitan 1 ranga, redaktor; IZACHIK, N.G., kontr-admiral, redaktor; LYUSHKOVSKIY, N.V., polkovnik, kandidat istoricheskikh nauk, redaktor. ANDREYEV, N.I., kapitan 1 ranga, redaktor; BOL'SHAKOV, N.V., kapitan 2 ranga, redaktor; BYKOV, P.D., kapitan 1 ranga v obstanovke, redaktor; KOVALEV, S.I., professor, redaktor.

[History of naval art] Istoriia voenno-morskogo iskusstva. Vol. 1. [Naval art of slaveholding and feudal society] Voenno-morskoe iskusstvo rabovladel'cheskogo i feodal'nogo obshchestva. 1953. 275 p. (MLRA 7:5)

1. Russia (1923- U.S.S.R.) Glavnyy shtab voyenno-morskikh sil Istoricheskoye otdeleniye.
(Naval art and science--History)

LYUSHNENKO, M. Z.

LYUSHNENKO, M. Z.: "Material on the problem of [illegible] pathohistologi-
cal changes in the skin in [illegible]itis." [illegible] State
Medical Inst imeni I. V. Stalin. [illegible], [illegible]. (Dissertation for the
Degree of Candidate in Medical Sciences.)

Source: Knizhnaya letopis' [illegible] [illegible] Moscow

LYUSHNENKO, M.Z. (Moskva)

Data on the problem of some pathohistological changes in the skin in neurodermatitis. Arkh.pat. 21 no.10:50-53 '59. (MIRA 14:8)

1. Iz kafedry patologicheskoy anatomii (zav. - zasluzhennyy deyatel' nauk prof. B.N.Mogil'nitskiy [deceased], konsul'tant temy - dotsent N.V.Balanina) pediatricheskogo fakul'teta II Moskovskogo meditsinskogo instituta imeni N.I.Pirogova.

(SKIN—DISEASES)

ZASLAVSKIY, B. (Khar'kov); LYUSHNIN, N. (Khar'kov); GOTENOV, S. (Khar'kov);
PIL'NIK, A. (Khar'kov); MISAN, L. (Khar'kov); GAYDACHUK, V.,
(Khar'kov); SBOYCHAKOV, V. (Khar'kov)

Attention and support to volunteer design offices. Kryl.rod.
14 no.3:2-3 Mr '63. (MIRA 16:4)
(Aeronautics--Technological innovations)

LYUSHVIN, V., starshiy inzhener

Two sides of one problem. Grazhd. av. 22 no.6:7-9 Je '65. (MIRA 18:6)

BABADZHANYAN, Pargev Artashevich; LYUSIN, Boris Ivanovich; POPOV, K.K., red.; VORONIN, K.P., tekhn.red.

[Design and production of collectors for electric machinery]
Konstruktsiia i proizvodstvo kollektorov elektricheskikh mashin.
Moskva, Gos.energ.izd-vo, 1960. 189 p. (MIRA 14:4)

(Electric current collectors) (Electric machinery)

LYUSKOVA, A.YE.

USSR/Agriculture - Stock raising

Card 1/1 Pub. 77 - 17/23

Authors : Lyuskova, A. E.

Title : High productivity in hog raising

Periodical : Nauka i Zhizn' 21/10, 33-35, Oct 1954

Abstract : A description is given of experimentation in hog raising on the Budennovets Collective Farm in the Vologod District. The experimentation was directed toward increasing the production through improved methods of feeding, selective breeding, etc., as well as soliciting the interest of workers through a system of awards. Illustrations.

Institution : ...

Submitted : ...

LYUSOV, A. N

KHOLIN, I.I., kand.tekhn.nauk, otv.red.; LEVMAN, B.S., red.; LOGINOV, Z.I., kand.ekonom.nauk, red.; LYUSOV, A.N., nauchnyy sotrudnik, red.; SHCHEPKIN, N.V., red.; KUZNETSOV, P.V., red.; PONOMAREVA, A.A., tekhn.red.

[Resources of the cement industry of the U.S.S.R.; based on data from the seminar of workers of the cement industry] Rezervy tsementnoi promyshlennosti SSSR; po materialam seminara rabotnikov tsementnoi promyshlennosti. Moskva, Gosplanizdat, 1959. 199 p. (MIRA 13:3)

1. Moscow. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti. 2. Direktor Gosudarstvennogo vsesoyuznogo nauchno-issledovatel'skogo instituta tsementnoy promyshlennosti (NIItsement) (for Kholin). 3. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti (NIItsement) (for Loginov, Lyusov).
(Cement industries)

LYUSOV, A.N.

Are the estimated prices for cement necessary? TSement 30 no.6:13-14 N-D '64. (MIRA 18:1)

LYUSOV, A.N.

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[illegible]

LYUSOV, A.N.

Effect on the net cost of cement of equipment and production concentration. Nauch.soob.NIITSementa no.8:33-37 '60. (MIRA 14:5)
(Cement industries--Costs)

LYUSOV, A. N.

Draft of a wholesale price list for cement. TSement 29 no.2: 11-12 Mr-Ap '63. (MIRA 16:4)

(Cement—Prices)

[illegible], [illegible]

[illegible]lization of [illegible] plants. Tsement 22 no. [illegible] — [illegible]

[illegible]

LYUSOV, A.N.

Concerning current delivery and factory prices of cement. Trudy NIITSement no.15:59-71 '61. (MIRA 14:9)
(Cement—Prices)

LYUSOV, A.N.

The necessity of changing the current prices for cement. TSement 27 no.6:17-19 N-D '61. (MIRA 15:3)
(Cement--Prices)

ASTA[illegible], L.M.; [illegible], [illegible]

[illegible] of [illegible] production. [illegible]

1. G[illegible]an [illegible].

LYUSOV, A.N., kand. ekon. nauk; GOGLIDZE, T.I., inzh.

Economic stimulation at cement plants. TSement 31 no. 6: 3-4 N-D '65. (MIRA 18:12)

KHARITONOV, V.S., inzh.; SVINARENKO, V.A., inzh.; LYUSOV, V.F., inzh.

Noise control on diesel-electric powered refrigerator ships. Sudostroenie 25 no.8:30-33 Ag '59. (MIRA 13:1)
(Refrigeration on ships) (Soundproofing)

LYUSOV, V.F., inzh.

Experimental studies of noise mufflers on general ventilation fans. Sudostroenie 26 no.2:29-33 (208) Feb '60. (MIRA 14:11)
(Ships--Heating and ventilation)
(Absorption of sound)

LYUBIMOVA, Ye.A.; LYUSOVA, L.N.; FIRSOV, F.V.; STARIKOVA, G.N.; SHUSHPANOV, A.P.

Determination of surface heat flow in Staraya Matsesta. Izv. AN SSSR. Ser. geofiz. no.12:1806-1811 D '60. (MIRA 13:12)

1. Institut fiziki Zemli AN SSSR.
(Earth temperature)

SOKOLIK, Anatoliy Ioniasovich, kand. tekhn. nauk; STANILOVSKIY, Anatoliy Ivanovich, inzh.; LYUSTENBERG, V.F., inzh., ved. red.; SOROKINA, T.M., tekhn. red.

[OK-23 double-beam electronic oscillograph with mechanical scanning]Dvukhluchevoi elektronnyi ostsillograf OK-23 s mekhanicheskoi razvertkoi. Moskva, Filial Vses. in-ta nauchn. i tekhn. informatsii, 1958. 19 p. (Peredovoi nauchno-tekhnicheskii i proizvodstvennyi opyt. Tema 35. No. P-58-26/3) (MIRA 16:2)
(Cathode ray oscillograph)

YAKHIMOVICH, L.A.; LYUSTERNAK, I.L.

Effect of high temperature on the nature of the reproduction of the migratory locust (Locusta migratoria L.). Dokl. AN SSSR 162 no.6:1408-1411 Je '65. (MIRA 18:7)

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LYUSTERNIK, L. A.

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Ob Odnoy Drayevoy Zadache V Teorii Nelineynykh Differentsial'nykh Uraveniy. DAN, 33 (1941), 5-8
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Sur quelques methodes Topologiques dans La geometric differentielle. ATTI Congr. dei Mat. Bologna 4(1928). 291-296.
Clber die Topologischen Eigenschaften der Kurvenfamilien Auf Flachen. Matem. AB., 38 (1931), 59-65.
Ob Uslovnykh Ekstremumakh Funktsionalov. Matem. SB., 41 (1934) 390-401.
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LYUSTERNIK, L. A. Continued

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Kol'tso Peresecheniy V Odnom Funktsional'Nom Prostranstve. DAN, 38 (1943). 67-70
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O Chisle Resheniy Odnoy Varistsionnoy Zadachi. DAN, 40 (1943), 215-217.
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LYUSTERNIK, Lazar'Aronovich, 1899

Polyhedra. Izd, 2. Moskva, Gos. izd-vo tekhn.-teoretich. lit-ry, 1941. 136 p. (49-32330)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031220014-7"

Lyusternik, L.

Lyusternik, L. Some problems of computational mathematics. Bull. Acad. Sci. URSS, Cl. Sci. Tech. [Izvestia Akad. Nauk SSSR] 1946, 1147–1156 (1946). (Russian) Expository lecture.

Source: Mathematical Reviews, Vol , No

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LYUSTERNIK, L. A.

Lyusternik, L. A. Obituary: Aleksei Nikolaevič Krylov (1863–1945). Uspehi Matem. Nauk (N.S.) 1(11), no. 1, 3–10 (1946). (Russian)

Source: Mathematical Reviews, Vol 8 No. 9

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031220014-7"

[illegible]IK, L. A.; Kolmogorov, A. [illegible] and Ye[illegible]rov, [illegible]

"Ideas and [illegible]" [illegible]

[illegible]-1..53, [illegible] Sep [illegible]

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031220014-7"

LYUSTERNIK, L.A.

Lyusternik, L. A. Topology and the calculus of variations. Uspehi Matem. Nauk (N.S.) 1(11), no. 1, 30–56 (1946). (Russian)

An expository article, surveying and assembling results obtained by applying topological methods to the study of critical points of functions and functionals; except for some references to G. D. Birkhoff and the earlier papers of M. Morse, only the Russian research is discussed. Functions on manifolds are discussed first; Morse's use of Betti numbers is mentioned, then the results obtained by use of "category." For example, if F is analytic on a torus, Morse's theorems yield the corollary that the sum of the multiplicities of the critical points of F is at least 4; use of category leads to the conclusion that there are at least three geometrically distinct critical points. The use of "length" is mentioned [cf. L. Elsholz, Rec. Math. [Mat. Sbornik] N.S. 5(47), 565–571 (1939); these Rev. 1, 317].

In applications to functionals, such as the study of geodesics on a manifold, analytic difficulties are intentionally ignored. The critical values of a functional J on a space R are, essentially, the values at which the topology of the set $R[J<c]$ changes. The methods rely greatly on Pontrjagin's "removing theorem" [cf. P. Alexandroff, Trans. Amer. Math. Soc. 54, 286–339 (1943); these Rev. 5, 48]. The theorems yield, as instances, known theorems on the existence of three closed geodesics on surface homologous to spheres, and infinitely many geodesics joining two fixed points of such surfaces. References are to several papers by Lyusternik already reviewed.

The paper concludes with a discussion of a sharpened form of Poincaré's method of continuation.

E. J. McShane (Charlottesville, Va.).

Source: Mathematical Reviews, [illegible]

[illegible], L. A.

"[illegible]," [illegible]

[illegible], 27 [illegible] 1

[illegible], L. A.

"[illegible] Ya. [illegible], Tables [illegible] rical [illegible] [illegible] According to the Methods of A. [illegible]," [illegible]

[illegible]

LY'STEN IK, L. A.

"G.V.Dinse, Aleksey [illegible]," [illegible]

[illegible]-1[illegible]3, 27 Sep [illegible]1

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031220014-7"

[illegible], L. A.

"A.[illegible].Krylov, [illegible]," [illegible]

[illegible]

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031220014-7"

L[illegible]STE[illegible]IK, L. A.

"A [illegible]eometrical [illegible]," [illegible]

[illegible]93, [illegible] [illegible] L

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031220014-7"

LYUSTERNIK, L.A.

Kobrinskii, N. E., and Lyusternik, L. A. Mathematical technics. Uspehi Matem. Nauk (N.S.) 1, no. 5-6(15-16), 3-26 (1946). (Russian)

This article forms an introduction to a series of papers [some translations] on computation by physical devices. It is largely concerned with general and rather well-known observations on the philosophy of these devices and such matters as their classification, their relation to and influence on other fields, sources of error, and historical material. Descriptions of and allusions to specific devices supporting the statements made make up much of the discussion of which roughly one-third concerns digital equipment, mostly of the punched-card type, while the remainder is divided among nondigital devices employing mechanical, electrical and optical principles. *R. Church* (Annapolis, Md.).

Source: Mathematical Reviews, Vol 10, No. 10

LYUSTERNIK, L. A.
W. E.

Mathematics

787

519.5

The Present State and Trends of Development of Calculating Technique.—N. E. Kobrinski & L. A. Lyusternik. (*Vestnik Akad. Nauk.*, 1946, No. 8-9, pp. 97-110. In Russian.) A general discussion covering analogue and digital machines. Sources of error are considered. A theorem due to S. A. Gershgorin states that a rod mechanism can be built representing any algebraic integral function of a complex variable. By combining a number of simple mechanisms almost any mathematical relationship can be realized. The operation of a machine developed by L. I. Gutenmacher for integrating differential equations in terms of partial derivatives of Laplace's equation is explained. Devices dealing with discrete values are considered with special reference to those using punched cards.

Lyusternik, L.

Lyusternik, L., and Šnirel'man, L. Topological methods in variational problems and their application to the differential geometry of surfaces. Uspehi Matem. Nauk (N.S.) 2, no. 1(17), 166–217 (1947). (Russian)

This article covers, with one exception which is discussed later, the same material as an earlier monograph [Méthodes topologiques dans les problèmes variationnels, Actual. Sci. Ind., no. 88, Hermann, Paris, 1934]. The difference between the two articles is that the present work fills in gaps and amplifies proofs of the former work, which according to the authors, proved to be too condensed. The following are the headings of the sections. Part I, the n-dimensional case: (1) critical points, (2) homotopy classes, (3) the principle of stationary points, (4) the category of a closed set with respect to a compact manifold, (5) an estimate of the number of solutions of a variational problem, (6) applications and examples, (7) the category of projective space, (8) applications of homology theory to estimating the category, (9) divisors of a manifold, (10) pseudo-category of pseudo-projective space. Part II, variational problems: (1) deformations of families of curves, (2) the category of families of curves, (3) families of neighborhoods on a sphere, (4) category of families of neighborhoods, (5) proof of some lemmas, (6) theorems on closed geodesics, (7) the operation of contracting curves, (8) the straightening deformation [see below], (9) the preceding deformation for systems of curves, (10) existence proof for an almost geodesic curve in an almost minimal system, (11) application of the theory of category.

The main problem of part II is the proof that at least three different closed geodesics exist on a surface of genus 0 in E^3. If the lengths c_i of the three geodesics are different, then it is still conceivable that, for instance, $c_2 = 2c_1$ and the geodesic corresponding to c_2 is twice the geodesic corresponding to c_1. The earlier book did not exclude this possibility. The present succeeds in doing so by considering only families of curves without multiple points. This necessitates a proof that the deformations of families of curves can be performed by staying within the realm of simple curves. This proves very complicated and is the content of sections (8) and (9) of part II. There is no reference to work later than the first article either on category or on the calculus of variations in the large, except for one paper of Borsuk in 1936 and one by El'sgol'c in 1939. *H. Busemann.*

Source: Mathematical Reviews, Vol 10, No. 9

Nov/Dec 1947

LYUSTENIK, L.A.

USSR/Mathematics - Biography

"Dmitriy Yevgen'yevich Men'shov," N.K. Bari, L.A. Lyusternik, 3 pp

"Upkhi Matematicheskikh Nauk" Vol II, No 6 (22)

Short biogfaphy written in honor of D. Ye. Men'shov's 25th anniversary of service with the Mathematical Collective of Moscow University. Briefly mentions some of his work.

PA 50T51

LYUSTERNIK, L.A.

Lyusternik, L. A. Remarks on the numerical solution of boundary problems for Laplace's equation and the calculation of characteristic values by the method of networks. Trav. Inst. Math. Stekloff 20, 49–64 (1947). (Russian)

The method of successive approximations as used in solving the vector equation (1) $x = Ax + y$, where y is known, x is an n-dimensional vector and A is an n-dimensional matrix, consists in starting with an arbitrary vector x^0 and forming successively the system of vectors $x^1, \cdots, x^k, \cdots$, where (2) $x^k = Ax^{k-1} + y$. If the sequence x^k converges to the vector x, it is said to be the solution of equation (1). However, the convergence may be very slow, in which case the problem is to extrapolate the approximations $x^1, \cdots, x^k$ already found so as to make the convergence more rapid without directly substituting in equation (2).

The author first considers the simple case when A is a symmetric matrix. Letting $\lambda_1, \cdots, \lambda_k$ be the characteristic values of A, and $u_1, \cdots, u_k$ the orthonormal system of the characteristic vectors, it follows that $x^k - x = \sum \lambda_i^k c_i u_i$. Thus, in particular, when a single greatest characteristic value λ exists,

$$x^k - x \sim \frac{1}{1-\lambda}(x^k - x^{k+1}) \sim \frac{1}{1-\lambda^2}(x^k - x^{k+2}),$$

and therefore x can be found when x^k, x^{k+1}, x^{k+2} are known. The case when two greatest (in absolute value) λ's exist is also considered.

As an illustration the method is applied to the numerical calculation of the solution of plane boundary problems of Laplace's equation by the method of networks. Here the problem reduces to finding a function u which satisfies, in addition to certain boundary conditions, the equation $u = Du$, where

$$Du = D^h u = \tfrac{1}{4} h^2 \nabla^h u + u,$$

$$\nabla u = \partial^2 u/\partial x^2 + \partial^2 u/\partial y^2,$$

$$\nabla^h u = 1/h^2[u(x+h, y) + u(x-h, y) + u(x, y+h) + u(x, y-h) - 4u(x, y)].$$

A numerical example is given.

The method is also applied to the Sturm-Liouville equation. *S. D. Zeldin* (Cambridge, Mass.).

Source: Mathematical Reviews, Vol 10, No. 1

LYUSTERNIK, L.A.

Lyusternik, L. A., and Ditkin, V. A. Approximate formulas for the calculation of multiple integrals. Izvestiya Akad. Nauk SSSR. Otd. Tehn. Nauk 1948, 1163–1168 (1948). (Russian)

Another version of an article already reviewed [Doklady Akad. Nauk SSSR (N.S.) 61, 441–444 (1948); these Rev. 10, 153]. *E. M. Bruins* (Amsterdam).

Source: Mathematical Reviews, Vol 10 No. 7

LYUSTERNIK, L.

Lyusternik, L. On a problem of the theory of tabulation. Uspehi Matem. Nauk (N.S.) 3, no. 4(26), 163–166 (1948). (Russian)

This paper discusses the conditions under which a function of three variables can be tabulated by means of three double entry tables. Nešuler [C. R. (Doklady) Acad. Sci. URSS (N.S.) 36, 121–124 (1942); these Rev. 4, 202] gave a condition in terms of two partial differential equations of the fourth order. The present paper inquires into the possibility of expressing this condition by a single partial differential equation of the third order and concludes that this cannot be accomplished. *D. H. Lehmer.*

Source: Mathematical Reviews, Vol 10 No. 2

LYUSTERNIK, L.A.

Lyusternik, L. A., and Ditkin, V. A. The construction of approximate formulas for the calculation of multiple integrals. Doklady Akad. Nauk SSSR (N.S.) 61, 441-444 (1948). (Russian)

In a Euclidean n-dimensional space $x=(x_1, \cdots, x_n)$ a domain Q in a k-dimensional manifold, $k\leqq n$, and a function $\varphi(x)$ on Q are given. The value of the k-fold integral $I(f)=\int_Q f(x)\varphi(x)dv$ is to be approximated by a mean value $\bar{I}(f)=\sum_{i=1}^{m} c_i f(A_i)$, c_i being constants and A_i points of Q. The approximation is said to be of order s if $I(f)=\bar{I}(f)$ whenever f is a polynomial of degree not exceeding s. Using the abbreviations $D_i=\partial/\partial\xi_i$, $(x, D)=\sum_{i=1}^{n} x_i D_i$, one has

$$\int_Q e^{(x,D)}\varphi(x)dv\cdot f(\xi)=\int_Q f(x+\xi)\varphi(x)dv,$$

$$\sum_{i=1}^{m} c_i e^{(A_i,D)}f(\xi)=\sum_{i=1}^{m} c_i f(A_i+\xi)$$

and so, to obtain an approximation of order s, the operator

$$U=\int_Q e^{(x,D)}\varphi(x)dv-\sum_{i=1}^{m} c_i e^{(A_i,D)}$$

has to transform all polynomials of degree not exceeding s into 0. A development in a power series of $D_1, \cdots, D_n$ gives immediately a system of equations from which c_i, A_i can be found.

The method is applied to

$$I(f)=\pi^{-1}\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(x, y)e^{-x^2-y^2}dxdy.$$

Here

$$\pi^{-1}\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} e^{xD_1+yD_2-x^2-y^2}dxdy=e^{\Delta/4}, \quad \Delta=D_1^2+D_2^2.$$

Starting from the four points $A_1=(\rho, 0)$, $A_2=(-\rho, 0)$, $A_3=(0, \rho)$, $A_4=(0, -\rho)$ the result $c_i=\frac{1}{4}$, $\rho=1$ is obtained and a formula of order 3 is

$$I(f)=\tfrac{1}{4}[f(1, 0)+f(0, 1)+f(0, -1)+f(-1, 0)].$$

Again, starting from the points $A_1, \cdots, A_8$ at the vertices of a regular octagon inscribed in a circle around the origin with radius $\sqrt{(2-\sqrt{2})}$, and $B_1, \cdots, B_8$ in the circle with radius $\sqrt{(2+\sqrt{2})}$, four of the vertices lying on the axes [in the paper the square roots are unfortunately omitted] one finds an approximation of order 7 in

Source: Mathematical Reviews, Vol 10 No. 2

L.A. Lyusternik + V.A. Ditkin Card 1 of 2

INST. Math. im V.A. Steklov, AS USSR

LYUSTERNIK, L. A.

Lyusternik, L. Certain cubature formulas for double integrals. Doklady Akad. Nauk SSSR (N.S.) 62, 449–452 (1948). (Russian)

For a given point $A(x, y) = A[r, \varphi]$ the operator $(D, A) = xD_1 + yD_2 = rD\cos(\varphi - \theta)$, $\partial/\partial x = D_1 = D\cos\theta$, $\partial/\partial y = D_2 = D\sin\theta$ gives the relation

$$\iint_{Q} f(x, y)\,dx\,dy = \sum c_i f(A_i)$$

for all polynomials of degree less than n if

$$\iint_{Q} \exp(xD_1 + yD_2)\,dx\,dy - \sum c_i \exp(D, A_i) \equiv 0 \pmod{D^n}.$$

The following results are obtained. (1) Taking $A_\nu = (\rho, 2\pi i/r)$,

$$S_{\rho,n} = n^{-1}\sum_{i=0}^{n-1} \exp(D, A_\nu) \equiv I_0(\rho D) \pmod{D^n},$$

where I denotes the Bessel function. (2) The operator of integration over the unit circle C is $\pi r = 2\pi D^{-1} I_1(D)$. (3) The operator of integration over the regular n-gon is calculated. (4) Putting

$$(2\pi)^{-1}\iint_{C} f(x, y)\,dx\,dy = C_0 f(0, 0) + \sum_{j=1}^{k} n^{-1} C_j \sum_{i=0}^{n-1} f(\rho_j, 2\pi i/n),$$

then

$$s_i - C_0 - \sum_{j=1}^{k} C_j S_{\rho_j, n} \equiv 0 \pmod{D^{(k+2)}}$$

can be obtained by taking ρ_j as the square roots of the roots of $L_k(x) = 0$, where L_k is an orthogonal system of polynomials in the interval $(0, 1)$ with the weight function x, and then calculating the C_j. The results for $k = 1, 2, 3$ are given as well as the corresponding formula for integration over the regular hexagon. [The reviewer would like to remark that the numerical results can be obtained in a few lines from the Taylor series.]

E. M. Bruins.

Source: Mathematical Reviews, Vol 10 No. 5

Lyusternik, L. A.

Lyusternik, L. A., Akušskiĭ, I. Ya., and Ditkin, V. A. Tablicy Besselevyh funkciĭ. [Tables of Bessel Functions]. Mathematical Tables, no. 1. Gosudarstv. Izdat. Tehn.-Teor. Lit., Moscow-Leningrad, 1949. 430 pp.

This volume contains seven tables. Table I: $J_0(x)$, $J_1(x)$, for $x=[0(.001)25; 7D]$, Δ^2. All of these values are implied in the more extensive Harvard tables [Tables of the Bessel Functions of the First Kind of Orders Zero and One . . . , Harvard University Press, 1947; these Rev. 8, 406]. Table II: Zeros α_k of $J_0(x)$, β_k of $J_1(x)$, γ_k of $J_1'(x)$, for $k=[1(1)40; 8D]$. The values for γ_k [7D for $k=1(1)10$] are mainly new. Tables III–VI: $J_0(\alpha_k x)$, $J_0(\beta_k x)$, $J_1(\beta_k x)$, $J_1(\gamma_k x)$, for $k=0(1)40$, $x=[.01(.01)1; 7D]$. These values are mostly new. Table VII: $2[J_1^2(\alpha_k)]^{-1}$, $2[J_0^2(\beta_k)]^{-1}=2[J_2^2(\beta_k)]^{-1}$, $2(1-\gamma_k^{-2})^{-1}[J_1^2(\gamma_k)]^{-1}$, for $k=[1(1)40; 7S]$. These new tables are for assisting in evaluating terms of the Fourier-Bessel expansions of a function. Tables III–VI and the table of $x \sin \pi x$ are also of use in this regard. The proof-reading seems to have been done in a careless fashion; for example, page numbers are missing, equality signs are incomplete (p. 374), values of β_{40} on pp. 408–409 are grossly incorrect, the last entry of the second column of the table on p. 347 is wrong, and on p. 348, for

$$\frac{2}{J_2^2(\beta_k)}\int_0^1 xf(x)J_0(\beta_n x)dx$$

read

$$\frac{2}{J_1^2(\alpha_n)}\int_0^1 xf(x)J_0(\alpha_n x)dx.$$

R. C. Archibald (Providence, R. I.).

Source: Mathematical Reviews, Vol 12, No. 2.

Lyusternik, L.A.

Lyusternik, L. A. On electrical modelling of symmetric matrices. Uspehi Matem. Nauk (N.S.) 4, no. 2(30), 198–200 (1949). (Russian)

H. Bode has shown [Z. Angew. Math. Mech. 17, 213–223 (1937)] how the unknowns of a system $\sum_{j=1}^{n} a_{ij}x_j = m_i$, $i=1, \cdots, n$, can be represented by the potentials of points $A_1, \cdots, A_n$ (current sources equal to the m_i) relative to the point A_0 if these $n+1$ nodes are interconnected by resistances (determined by the a_{ij}) provided that for the matrix of the system

(1) $a_{ij}=a_{ji}$, (2) $a_{ii} \geqq \sum_{j \neq i} |a_{ij}|$ and (3) $a_{ij} \leqq 0$, $j \neq i$.

It is shown that by using n additional points $B_1, \cdots, B_n$, the potential of B_i relative to A_0 to be the negative of that of A_i, the last condition can be removed. This is done by writing the left hand sides of the equations as

$$\sum_{j \neq i} |a_{ij}| (x_i + x_j \operatorname{sgn} a_{ij}) + (a_{ii} - \sum_{j \neq i} |a_{ij}|) x_i.$$

Then A_i is connected to B_j or A_j and B_i is also connected to A_j or B_j, $j \neq i$, by conductances equal to a_{ij} according as sgn a_{ij} is plus or minus one, and A_i and B_i are each connected to A_0 by conductances equal to $a_{ii} - \sum_{j \neq i} |a_{ij}|$. The principle of superposition can be employed to advantage in almost exactly the same way as was done by Bode to make only one current source necessary. *R. Church.*

Source: Mathematical Reviews, 1950, Vol 11 No. 2

LYUSTERNIK, L. A.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 562 - I

Call No.: AF437939

BOOK
Authors: LYUSTERNIK, L. A. and SOBOLEV, V. I.
Full Title: ELEMENTS OF FUNCTIONAL ANALYSIS
Transliterated Title: Elementy funktsional'nogo analiza
PUBLISHING DATA
Originating Agency: None
Publishing House: State Publishing House of Technical and Theoretical Literature
Date: 1951 No. pp.: 360 No. of copies: 6,000
Editorial Staff
Editors: V. G. Ashkinuze and D. A. Raykov. Contributors: Yu. B. Germeyer, A. I. Plesner and M. P. Shura-Bura
PURPOSE: A textbook for University Mathematical Departments
TEXT DATA
Coverage: In the preface, the authors explain the value of functional analysis in its application to theoretical and applied mathematics in various fields as developed during the last decades. The introduction states that the functional analysis is not only a generalization, but also a "geometrization" of basical principles and methods of the classical analysis by the introduction of abstract space. The text is divided into six chapters and two appendices. The first chapter deals

.. Elementy funktsional'nogo analiza

with metric space and the theory of sets. The second covers linear spaces and linear operators. The third discusses linear functionals. In the fourth, entirely continuous operators are presented. The fifth chapter gives the elements of the spectral theory of self-conjugated operators in Hilbert's space. In the sixth the authors discuss some questions of non-linear functional analysis. Appendix I gives auxiliary inequalities and Appendix II two methods to find the n-th derivative of a function of a real variable. The book has a list of literature for reference and an index with a table of pages which contain major properties of the most important functional spaces: elements and metric, norm, fullness, separability, general type of a linear functional, regularity.

No. of References: Total 51, 1903-1951, of which 39 are Russian.

Facilities: None

LYUSTERNIK, L. A.

177T58

USSR/Mathematics - Mathematician Jan/Feb 51

"Mikhail Alekseyevich Lavrent'yev: on the Occasion of his 50th Birthday," L. A. Lyusternik, M. R. Shura-Bura

"Uspekhi Matemat Nauk" Vol VI, No 1 (41), pp 190-192

Lavrent'yev is an eminent Soviet scientist and active member of three academies: Acad Sci USSR, Acad Sci Ukrainian SSR, and Acad Arty Sci. Early student days were spent in Kazan U. He became a professor in 1930 at Moscow U. From 1939 to 1948

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LC

USSR/Mathematics - Mathematician (Contd) Jan/Feb 51

he was Dir, Inst of Math, Acad Sci Ukrainian SSR, and worked in Ufe during World War II. In 1946 he was awarded the Stalin prize first class for work on quasiconformal reflections and their application.

177T58

LC

191T83

LYUSTERNIK, L. A.

USSR/Mathematics - Trigonometric Series Jul/Aug 51

"The Works of D. Ye. Men'shov on Trigonometric Series," N. K. Bari, L. A. Lyusternik

"Uspekh Matemat Nauk" Vol VI, No 4 (44), pp 187-189

Subject works won a Stalin prize in 1951. Discussion of the main points of Men'shov's groups of studies on Fourier series, their convergence, representation, expansion, existence, summability, etc. His works are included in the Moscow school of the theory of functions.

191T83

LYUSTERNIK, L.A.

PA 196T73

USSR/Mathematics - Fourier Series Nov/Dec 51

"N. N. Luzin's Works on the Metric Theory of Functions," N. K. Bari, L. A. Lyusternik

"Uspekh Matemat Nauk" Vol VI, No 6, (46), pp 28-46

Written in connection with the coming publication of the works of Luzin. Merely states demonstrations of theorems and indicates future developments of his work. Luzin's work on trigonometric series was closely connected to the general problems of the metric theory of functions.

196T73

LYUSTERNIK, L. A.

PA 196T81

USSR/Mathematics - Mathematician Nov/Dec 51

"Miss Nina Karlovna Bari," M. A. Lavrent'yev, L. A. Lyusternik

"Uspekh Matemat Nauk" Vol VI, No 6 (46), pp 184, 185

Announcement of the completion of 25 years of work at Moscow State U by the distinguished Soviet mathematician Prof Nina Bari. She was born into the family of a doctor in Moscow; attended Moscow State U after completion of middle school in 1918. She studied under teacher N. N. Luzin, founder of a mathematical school. After graduation she remained at the University

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USSR/Mathematics - Mathematician (Contd) Nov/Dec 51

to study in the Inst of Math and Mech, where she defended in 1926 her thesis and became a Privatdocent. In 1932 she became a professor and in 1935 she received her degree of Dr of Physicomath Sci at the University. Her work has been in the theory of the functions of a real variable.

196T81

Lyusternik, L. A.

Lyusternik, L. A., and Fet, A. I. **Variational problems on closed manifolds.** Doklady Akad. Nauk SSSR (N.S.) 81, 17–18 (1951). (Russian)

Let R be a closed n-dimensional manifold (which is supposed four times differentiable) and let J denote a regular positive variational problem concerning piecewise continuously differentiable curves on R. The authors prove: (1) there exist at least two distinct extremals of J which join two arbitrarily given points of R; (2) there exists a closed extremal of J on R. No reference is made to work on these topics outside Russia. *L. C. Young* (Madison, Wis.).

Source: Mathematical Reviews, Vol 13 No. 5

LYUSTERNIK, L.A., chlen-korrespondent, otvetstvennyy redaktor.

[Ten-place tables of logarithms of complex numbers and the transition from Descartian to polar coordinates; tables of functions $\ln x$, $\operatorname{arctg} x$, $\frac{1}{2}\ln(1+x^2)$, $\sqrt{1+x^2}$.] Desiatiznachnye tablitsy logarifmov kompleksnykh chisel i perekhoda ot dekartovykh koordinat k poliarnym; tablitsy funktsii $\ln x$, $\operatorname{arctg} x$, $\frac{1}{2}\ln(1+x^2)$, $\sqrt{1+x^2}$ Moskva, Izd-vo Akademii nauk SSSR, 1952. 115 p. (MLRA 6:5)

1. Akademiya nauk SSSR, Institut tochnoy mekhaniki i vychislitel'noy tekhniki. (Logarithms)

USSR/Mathematics - Biographic May/Jun 52

"Mathematical Life in the USSR: Dmitriy Yevgen'yevich Men'shov, on the Occasion of His 60th Birthday," N. K. Bari, L. A. Lyusternik

"Uspekh Matemat Nauk" Vol VII, No 3 (49), pp 145-150

Born in Moscow. Father was school physician of Lazarevskiy Inst of Oriental Languages, where he received his early training (gymnasium); 1st interest was oriental languages, which he still maintains. Received Stalin prize in 1951 for works on theory of trigonometric series, his main field

218T71

USSR/Mathematics - Biographic (Contd) May/Jun 52

(Fourier series). Recent works are "Fourier Series of Continuous Functions"; "Certain Problems From Theory of Trigonometric Series (Survey)"; "Limits of Indeterminability of Trigonometric Series"; "Measure Convergence of Trigonometric Series"; "Partial Sums of Series in Orthogonal Functions"; "Fourier Series of Continuous and Summable Series."

218T71

LYUSTERNIK, L.A.

ABRAMOV, A.A.; LYUSTERNIK, L.A., otvetstvennyy redaktor.

[Tables for lnΓ(z) in a complex domain] Tablitsy lnΓ[z] v kompleksnoi oblasti. Moskva, Izd-vo Akademii nauk SSSR, 1953. 333 p. (Matematicheskie tablitsy) (MLRA 7:4)

1. Chlen-korrespondent Akademii nauk SSSR (for Lyusternik). (Mathematics--Tables, etc.)

LYUSTERNIK L.A.

DITKIN, V.A.; LYUSTERNIK, L.A.

One application of practical harmonic analysis on the sphere. Vych. mat.i vych.tekh. no.1:3-13 '53. (MLRA 7:9)
(Spherical harmonics)

ators d_1 and d_2 ...
initial conditions

(2) $$\left.\frac{\partial^k u}{\partial t^k}\right|_{t=0} = \varphi_k(x, y) \quad (k=0, 1, \cdots, n-1).$$

Let (x_i, y_i) $(i=0, 1, \cdots, n-1)$, denote the coordinates of n equally spaced points on a circle of radius ρ with center at the origin. Then by means of the translation operator $\exp\{x_i d_1 + y_i d_2\}$ it is possible to express a sum of the type

(3) $$\sum_{i=0}^{n-1} \psi(x+x_i, y+y_i)$$

EYUSTE[illegible]K, L. A.

as a result of an operator $S(\rho, d_1, d_2)$ operating on the function $\psi(x, y)$. By different choices of ρ several such operators may be obtained, $S_1, S_2, \cdots, S_n$. Now (1) can be solved formally in terms of t and the result expressed thus:

$$u = \sum_{k=0}^{n-1} F_k(d_1, d_2; t)\, \varphi_k(x, y). \tag{4}$$

The heart of the method is now to express the operators $F_k(d_1, d_2; t)$ by means of $S_1, S_2, \cdots, S_n$, and hence finaliy the right-hand member of (4) is expressed by sums of the type (3) applied to $\varphi_k(x, y)$.

Several examples are worked in detail. *W. E. Milne.*

Lyusternik, L. A.

Lyusternik, L. A. On convergence of an iterative process of solution of a system of algebraic equations for random initial data and accumulation of errors. Vyčisl. Mat. Vyčisl. Tehn. 1, 41–45 (1953). (Russian)

A system $y = Ay + b$, where A is symmetric and of order n; ... process $y_k = Ay_{k-1} + b$. Assume the ... to be error growing like ... [see the preceding ... analysis of Abramov [see the preceding review] ... and should be replaced ... author that $\ln k$ is indeed too high, and should be replaced for $k > n$ by $\ln n$. The case $\nu = 3$ is mentioned also.

G. E. Forsythe (New York, N. Y.).

LYUSTERNIK, L. A.

math

4

Mathematical Reviews
Vol. 14 No. 8
Sept. 1953
Analysis

8-10-54
LL

Lyusternik, L. A. On polynomial approximation of functions given in the whole plane. Uspehi Matem. Nauk (N.S.) 8, no. 1(53), 161–164 (1953). (Russian)

S. Bernstein [Bull. Soc. Math. France 52, 399–410 (1924)] proved that if $f(x)$ is continuous and $f(x)e^{-|x|}\to 0$ as $|x|\to\infty$, then $f(x)$ admits approximation by polynomials with the weight $e^{-|x|}$, i.e., there is a sequence of polynomials $P(x)$ such that $\sup_x|f(x)-P(x)|e^{-|x|}\to 0$. The author proves, by reducing it to the one-variable case, the corresponding theorem for two variables: if $f(r, \phi)$ is continuous in the whole plane and $\sup_\phi|f(r, \phi)|e^{-r}\to 0$ as $r\to\infty$, then there are polynomials $P(x, y)$ such that

$$\sup_r \{\sup_\phi|f(r, \phi)-P(r\cos\phi, r\sin\phi)|\}e^{-r}\to 0.$$

R. P. Boas, Jr. (Evanston, Ill.).

Mathematical Reviews
Vol. 15 No. 3
March 1954
Numerical and Graphical Methods

7-13 54

LL

Lyusternik, L. A. Application of cubature formulas to numerical solution of Cauchy's problem for certain partial differential equations. Uspehi Matem. Nauk (N.S.) 8, no. 4(56), 178–181 (1953). (Russian)

4

Let Q_c be the normed linear space of all continuous functions $\varphi(A)$ defined at all points A of the (x, y)-plane which grow more slowly than $\exp c|A|^2$ for $c>0$ as $|A|^2\to\infty$, and let $\|\varphi\|_c=\max|\varphi(A)\exp(-c|A|^2)|$. Consider the operator $u(t, l)$ defined by

$$u(t, l)\varphi(A)=c_0\varphi(A)+\sum_1^l c_i S[2t^{\frac{1}{2}}\rho_i, 4l+2]\varphi(A).$$

Here $S[\rho, n]\varphi(A)$ is the arithmetic mean of the values of φ at the vertices of a regular polygon of n sides inscribed in a circle of radius ρ, center A. The positive numbers c_i and ρ_i satisfy $c_0+\sum_1^l c_i=0$ and $\sum_1^l c_i\rho_i^{2s}=s!$, $1\leqq s\leqq 2l$. The author shows that if $\varphi\in Q_c$ and $0<t<1/8c$, then as $l\to\infty$, $u(t, l)\varphi(A)$ converges, in the sense of the metric of Q_{2c}, to the solution of the heat equation $\partial v/\partial t=\Delta v$ with $v(x, y, 0)=v(A, 0)=\varphi(A)$. At all finite points A at any time t in the interval $[t_0, t_1]$ with $0<t_0<t_1<1/8c$ the convergence is uniform.

J. H. Giese (Havre de Grace, Md.).

LYUSTERNIK, L. A.

USSR/Mathematics - Nonlinear Operators Jul/Aug 53

"Application of Variational Methods in the Problem on Bifurcation Points," M. A. Krasnosel'skiy, Voronezh

Mat Sbor, Vol 33 (75), No 1, pp 199-214

Gives the following definition: The number λ_0 is called a bifurcation point of a nonlinear operator A acting in a certain Banach space if for any positive epsilon and delta one can find an eigenvalue lambda and an eignevector phi of A (i.e. $A\varphi=\lambda\varphi$) such that $|\lambda-\lambda_0|<\varepsilon$, $\|\varphi\|<\delta$. Operators that act in a Hilbert space H and are the gradients of certain

271T89

functionals are defined as potential operators, following the ideas of L. A. Lyusternik and L. G. Shnirel'man. Aim here is to demonstrate the basic theorem that specifies when each eigenvaue of a linear operator B is the point of bifurcation of a nonlinear operator G. Acknowledges assistance of A. I. Povolotskiy in the formation of this work. Presented 13 Oct 52.

271T89

LYUSTERNIK, L.A.

USSR/Mathematics - Approximations 1 Apr 53

"Eigenvalues of Finite-Difference Approximations of the Laplace Operator," L.A. Lyusternik, Corr Mem Acad Sci USSR

DAN SSSR, Vol 89, No 4, pp 613-616

Considers a more extensive class of network approximations of the Laplace operator from the viewpoint that finite-difference approximations of operators possess certain so-called "parasitic" properties which belong to the given approximation rather than to the original operator, and that the eigen elements

256T102

corresponding to the least-negative eigenvalues of the approximating operator bear a "parasitic" character, when shown to depend on the choice of the approximating operator. Cites related work of O'Brien et al. (J Math and Phys. 29, 223 (1951)). Submitted 7 Feb 53.

256T102

LYUSTERNIK, L. A.

USSR/Mathematics - Approximation of Laplacian 53

"General Grid Approximations of the Laplace Operator," L. A. Lyusternik, Corr-Mem, Acad Sci USSR

DAN SSSR, Vol 91, No 6, pp 1267-1269

Continues his earlier work (DAN 89, No 4, 1953), in which he investigated the eigenvalues and elements of the general grid approximations of the Laplace operator. In the present work the author considers the convergence of these eigenvalues and elements to the eigenvalues and eigenfunctions of the Laplace operator. Presented 13 Jun 53.

275T79

LYUSTERNIK, L. A.

USSR/Mathematics - Numerical Solutions

Card 1/1

Author : Lyusternik, L. A.

Title : Difference approximations of the Laplace operator

Periodical : Usp. mat. nauk, 9, No 2(60), 3-66, 1954

Abstract : Treats the problems connected with the difference (i.e. grid) approximations of the Laplace differential operator, delta. Considers the various grid configurations and their corresponding operators, the convergence and stability of certain iterative processes, the case of the parallel grid, the convergence of difference analogs in the Dirichlet problem, the eigenfunctions, probable evaluations of the error deviations. Thirteen references: 9 USSR, latest (1953) by A. A. Abramov, L. V. Kantorovich and V. I. Krylov, Sh. Ye. Mikeladze, V. S. Ryaben'kiy, M. R. Shura-Bura, and D. M. Eydus (1952).

LYUSTERNIK, L.A.

"Operational calculus." J.Mikusinski. Reviewed by F.D.Gakhov. Usp.mat.nauk 9 no.4:276-277 '54. (MLRA 8:1)
(Calculus, Operational) (Mikusinski, J.)

LYUSTERNIK, Lazar' Aronovich; LAPKO, A.F., redaktor; GAVRILOV, S.S., tekhnicheskiy redaktor

[Shortest lines; variational problems] Kratchaishie linii; variatsionnye zadachi. Moskva, Gos.izd-vo tekhniko-teoret.lit-ry, 1955. 102 p. (Populiarnye lektsii po matematike, no.19)
(Calculus of variations) (Line geometry) (MLRA 9:3)

book ... functional analysis ... functionals ... An advanced text

Sovm

R38

LYUSTERNIK, L.A., prof.; MEN'SHOV, D.Ye., prof., otv.red.

[Program in the calculus of variations; for the Mechanics-Mathematics Faculty] Programma po variatsionnomu ischisleniiu dlia mekhaniko-matematicheskogo fakul'teta. 1956. 1 p. (MIRA 11:3)

1. Moscow. Universitet.
(Calculus of variations--Study and teeaching)

BERMANT, Anisim Fedorovich; LYUSTERNIK, Lazar' Aronovich; RYVKIN, A.Z., redaktor; TSLAF, L.Ya., redaktor; MURASHOVA, N.Ya., tekhnicheskiy redaktor

[Trigonometry] Trigonometriia. Moskva, Gos.izd-vo tekhniko-teoret. lit-ry, 1956. 179 p. (MLRA 9:4)

(Trigonometry)

LYUSTERNIK, Lazar' Aronovich; LAPKO, A.F., redaktor; NEGRIMOVSKAYA, P.A., tekhnicheskiy redaktor

[Convex figures and polyhedra] Vypuklye figury i mnogogranniki. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1956. 212 p.
(Polyhedra) (MLRA 10:1)

HOUSEHOLDER, A.S.; ZHIDKOV, N.P. [translator]; SEROV, M.I. [translator]; LYUSTERNIK, L.A., redaktor; KLIMENKO, S.V., tekhnicheskiy redaktor

[Principles of numerical analysis. Translated from the English] Osnovy chislennogo analiza. Perevod s angliiskogo N.P.Zhidkova i M.I.Serova. Pod red. L.A.Liusternika. Moskva, Izd-vo inostrannoi lit-ry, 1956. 320 p. (MIRA 9:11)

(Numerical calculations)

H

1-F\W

Lyusternik, L. A. Solution of problems of linear algebra by the method of continued fractions. Voronež. Gos. Univ. Trudy Sem. Funkcional. Anal. no. 2 (1956), 85–90. (Russian)

The basic problem is to make more precise (i.e., accelerate the convergence of) the ordinary iterative algorithm $b^{(k)}=Ab^{(k-1)}+b$ for solving the finite linear system (*) $y=Ay+b$. Here A is a symmetric matrix of order n, and b is assumed to belong to no invariant space of A of dimension $<n$.

Let $R_0(\lambda)=\sum_{s=0}^{\infty} d_s/\lambda^{s+1}$, where $d_s=(A^s b, b)$. Let $q_k(\lambda)$ be the denominator of the kth convergent to the continued fraction

$$R_0(\lambda)=\frac{\lfloor \alpha_0}{\lambda-\beta_0|}-\frac{\lfloor \alpha_1}{\lambda-\beta_1|}-\cdots.$$

Write $q_k(\lambda)=a_0\lambda^k+a_1\lambda^{k-1}+\cdots+a_k$, and $a_s'=a_s/q_k(1)$. The author's solution to his problem is to approximate y by the following formula, exact when $n_0=n$:

(**) $y=$

$$b^{(k_0)}-\left(\sum_{s=0}^{n_0-1} a_s'\right)b^{(k_0)}+\left(\sum_{r=1}^{n_0-1} a'_{n_0-r-1}b^{(k_0+r)}+a'_{n_0-1}b^{(k_0+n_0)}\right).$$

1/2

LYUSTERNIK, L.A. H

There is a discussion of how to find the $\{a_i\}$ in principle from the $\{d_i\}$, but the process is not reduced to an algorithm. There is a reference to the work of Lanczos [J. Res. Nat. Bur. Standards 45 (1950), 255–282; MR 13, 163] for getting the $\{a_i\}$. (However, there is no mention of the well developed QD algorithm of Rutishauser [e.g., Z. Angew. Math. Phys. 5 (1954), 496–508; MR 16, 863] for the same purpose. Nor is the work of Hestenes and Stiefel [J. Res. Nat. Bur. Standards 49 (1952), 409–436; MR 15, 651] mentioned, although their conjugate-gradient algorithm apparently goes directly from the equation (*) to the solution (**) for $k_0=0$, avoiding the computation of the $\{d_i\}$ and the $\{a_i\}$, at least when $A-I$ is a definite matrix.) *G. E. Forsythe* (Stanford, Calif.).

2/2

LYUSTERNIK, L.A.

SUBJECT USSR/MATHEMATICS/Applied Mathematics CARD 1/1 PG - 472
AUTHOR LJUSTERNIK L.A., AKUŠSKIJ I.Ja.
TITLE On a method of the numerical harmonic analysis.
PERIODICAL Izvestija Akad.Nauk Kazach.SSR 4,(8), 80-85 (1956)
reviewed 1/1957

This is a report on the practical application of a method for the computation of Fourier coefficients by use of computers, proposed by Ljusternik (Uspechi mat.Nauk 1, fasc.5-6 (1947)). By replacing every semi-arc of the sinus by a parabola arc the work of computation becomes less.

Lyusternik, L. A. Certain questions in non-linear functional analysis. Uspehi Mat. Nauk (N.S.) 11 (1956), no. 6(72), 145–168. (Russian)

This is an expository article on the problems and methods of nonlinear functional analysis. Among the topics treated are: the differential of a mapping from one function space into another; power series, differential equations, and implicit function theorems in function spaces; the branch point theory for functional equations developed by A. Liapounoff and E. Schmidt; the Leray-Schauder topological degree for mappings in function spaces; and a number of aspects of the Morse theory.

J. Cronin (New York, N.Y.).

1-FW

2

LJUSTERNIK, L.A.

SUBJECT USSR/MATHEMATICS/Functional analysis CARD 1/2 PG - 671
AUTHOR VIŠIK M.I., LJUSTERNIK L.A.
TITLE Stabilization of the solutions of certain differential equations in the Hilbert space.
PERIODICAL Doklady Akad.Nauk 111, 12-15 (1956)
reviewed 4/1957

The family of trajectories $\{u = u(t)\}$ $(t_0 \leq t < \infty)$ stabilizes to the curve $v(t)$ if $\lim_{t \to +\infty} \varrho(u(t), v(t)) = 0$ is valid for all $u(t)$.

In the Hilbert space H the authors consider the differential equation

(1) $$\frac{du(t)}{dt} + A(t)u(t) = f(t) \qquad u\big|_{t=t_0} = u_0$$

and the corresponding family of equations (depending on t)

(2) $$A(t)v(t) = f(t).$$

It is assumed that $\{A(t)\}$ is a family of linear operators which possess a region of definition Ω being dense in H and independent of t, where besides

$$(A(t)u,u) \geqslant \gamma(t)(u,u) \qquad \gamma(t) > 0.$$

If besides

$$\|A_t'(t)v\| \leq \delta(t)\,\|A(t)v\|,$$

then one of the following conditions is sufficient that the solutions u(t) of (1) stabilize with respect to the solution v(t) of (2): either

$$\gamma(t) \geqslant c^2 > 0, \quad \varepsilon(t) = \frac{1}{\gamma(t)} \|f'(t)\| + \frac{\delta(t)}{\gamma(t)} \|f(t)\| = O(t^{-r}), \quad r > 0$$

or

$$\gamma(t) = O(t^{-r_1}), \quad 0 < r_1 < 1, \quad \varepsilon(t) = O(t^{-r}), \quad r > 0$$

or

$$\gamma(t) = O(t^{-1}), \quad \varepsilon(t) = O(t^{-r}), \quad r > 1.$$

For establishing the criteria of stabilization by aid of these conditions one often necessitates an estimation for $\frac{du(t)}{dt}$. The authors propose:

$$\left\| \frac{du(t)}{dt} \right\| \leqslant \left\| \frac{du}{dt} \right\|_{t=t_0} \exp\left(-\int_{t_0}^{t} \gamma_1(\tau)\,d\tau\right) + \psi(\gamma_1(t), \varepsilon(t)),$$

where $\gamma_1(t) = \gamma(t) - \delta(t) > 0$ and $\psi(\gamma(t), \varepsilon(t)) = \int_{t_0}^{t} \varepsilon(\tau) \exp\left(-\int_{\tau}^{t} \gamma(\sigma)\,d\sigma\right) d\tau.$

LJUSTERNIK, L.A. LJUSTERNIK, L. A.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/1 PG - 661
AUTHOR VIŠIK M.I., LJUSTERNIK L.A.;
TITLE Stabilization of the solutions of parabolic equations.
PERIODICAL Doklady Akad.Nauk 111, 273-275 (1956)
reviewed 3/1957

The criteria obtained by the authors for the stabilization of solutions of non-stationary equations into corresponding solutions of stationary equations are applied in order to investigate the stabilization of the solutions of mixed problems for parabolic equations into solutions of corresponding boundary value problems for elliptic equations.
At first sufficient conditions for the convergence in the mean of the initial solution to the other one are set up, and then sufficient conditions for the uniform convergence are given.

LYUSTERNIK, L.A.

A finite-difference analogue of Green's function in the three-dimensional case. Vych. mat. no.1:3-22 '57 (MIRA 10:11)
(Operators (Mathematics)) (Functional analysis)

LYUSTERNIK L A

AUTHOR: VISHIK M.I., LYUSTERNIK L.A. 42-5-1/17

TITLE: Regular Degeneration and Boundary Layer for Linear Differential Equations With a Small Parameter (Regulyarnoye vyrozhdeniye i pogranichnyy sloy dlya lineynykh differentsial'nykh uravneniy s malym parametrom)

PERIODICAL: Uspekhi Mat.Nauk, 1957, Vol.12, Nr.5, pp.3-122 (USSR)

ABSTRACT: In the domain Q of the n-dimensional space ($n \geqslant 1$) let be given the linear differential equations

(1) $$L_{\varepsilon} u_{\varepsilon} = h$$

and on the boundary Γ of Q let be given certain boundary conditions $\mathcal{L}$. Here let the coefficients of L_{ε} depend on ε such that for $\varepsilon = 0$ the coefficients vanish for the highest derivatives. This boundary value problem is called the problem A_{ε}. For $\varepsilon = 0$ it changes to the problem A_0: solution of the equation

(2) $$L_0 w_0 = h$$

for the boundary conditions $\mathcal{L}_0$, where $\mathcal{L} = \mathcal{L}_0 + \mathcal{L}_1$. The solution of u_0 of A_0 in general does not satisfy the conditions $\mathcal{L}_1$,

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besides often it is less smooth than the solution of A_{ε}. But in a number of boundary value problems for small ε, $u_{\varepsilon}-u_0$ differs only noticeable from zero in the neighborhood of Γ, here the principal part of the difference has the so-called character of boundary layers which compensates the non-satisfaction of the conditions $\mathcal{L}_1$. In the present paper the authors prove the existence of a great class of problems A_{ε} with the described boundary layer effect ("problems with a regular degeneration"), they give a method of construction of the boundary layer, obtain an asymptotic expansion for the solution u_{ε} of A_{ε} and estimate the remainder terms of the obtained approximate solutions and their derivatives. The detailed paper consists of an introduction, ten paragraphs, the formulation of some questions being in connection with the present investigations and a bibliography of 53 numbers. The first three paragraphs treat ordinary differential equations and contain already all essential methods of the authors, in the paragraphs 4-10 then these results are extended to the elliptic partial equations of second and higher order and to parabolic equations with a degenerating elliptic part.

35 Soviet and 18 foreign references are quoted.

Card 2/2

1. Differential equations-Applications 2. Boundary layer

LYUSTERNIK, L. A.

AUTHOR: LAPKO, A.F., LYUSTERNIK, L.A. 42-6-3/17

TITLE: Mathematical Congresses and Conferences in the USSR (Matematicheskiye s"yezdy i konferentsii v SSSR)

PERIODICAL: Uspekhi Matematicheskikh Nauk, 1957, Vol.12, Nr.6, pp.47-130 (USSR)

ABSTRACT: The authors give a survey on mathematical congresses which have taken place in the Soviet Union during the last 40 years. The paper consists of ten paragraphs. §1 Introduction and general survey; §2 Russian Mathematical Congress, Moscow April 27-May 4, 1927; §3 First Union Congress of Mathematicians, Kharkov 1930; §4 Second Union Congress, June 24-30, 1934; §5 First international conference on tensorial differential geometry, Moscow, May 17-23, 1934 and first international topological conference, Moscow 1935; §6 The attempt of forming a union partnership of mathematicians and the periodical "Uspekhi matematicheskikh nauk" during the period before the war; §7 The Congresses between 1935-1941; §8 The years of war and after the war 1941-1949; §9 The conferences of the years since 1950; §10 Third Union Congress of Mathematicians June 25-July 4, 1956.
62 Soviet references are quoted.

AVAILABLE: Library of Congress
Card 1/1

AUTHOR VISHIK M.I., Corresponding Member of the Academy, LYUSTERNIK L.A., PA - 3030

TITLE On Elliptical Equations Which Contain Small Parameters in the Higher Derivations.
(Ob ellipticheskikh uravneniykh, soderzhashchiye maliye parametry pri starshikh proizvodnykh -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 4, pp 734-737 (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT In the linear case the following problem, among others, arises for such equations: A family of operators is assumed which depend upon the parameter ε and are defined within the domain G of the space $(x_1, \ldots, x_n)$: $L_{r,\varepsilon} u = \sum_{s=p} \varepsilon^{s-p} L_s u$. Here $L_s u$ denotes a differential operator of the order $\leqslant s$, which, for reasons of simplicity, is in this case not assumed to depend on ε. The solution $u_\varepsilon(x)$ of the equations $L_{r\varepsilon} u = h$, the asymptotic behavior of the solutions $u_\varepsilon(x)$ for small ε, and their connection with a certain solution $w(x)$ of the equation $L_p w = h$. are investigated for the corresponding boundary conditons. The present paper examines the case in which r and p are even numbers: $p = 2k$, $r = 2(k+1)$. The operators $L_{r,\varepsilon}$ and L_p are assumed to be elliptical. The solution $u_\varepsilon(x)$ of the equation $L_{r,\varepsilon} u = h$ is here investigated within the domain G with the boundary q and the homogeneous boundary conditions of the first boundary value problem are assumed on q. Also inhomogeneous boundary conditions, by the way, present no dif-

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On Elliptical Equations Which Contain Small Parameters in the Higher Derivations. PA - 3030

ficulties. The conditions imposed here upon the operators $L_{r,\varepsilon}$ and L_p are given. The difference $v_\varepsilon(x)$ between $u_\varepsilon(x)$ and $w(x)$ here has the character of a boundary layer of k-th order. It is one of the aims of this paper to obtain, if possible, the elementary construction of the boundary layer $v_\varepsilon(x)$, which can be extended also to other problems with small parameters. This construction of v_ε is here reduced to the solution of an ordinary differential equation with constant coefficients. The course of the computations is follwed. Eventually following theorem is obtained: the solution u of the problem $L_{r,\varepsilon}u = h$ (1)

$$u\Big|_q = \dots = \frac{\partial^{k-1}u}{\partial n^{k-1}}\Big|_q = 0,\ \frac{\partial^k u}{\partial n^k}\Big|_q = \dots = \frac{\partial^{k+l-1}u}{\partial n^{k+l-1}}\Big|_q = 0$$

can be represended by the formula $u_\varepsilon = (w_0 + v_\varepsilon^* + \varepsilon\alpha_0^*) + \varepsilon(w_1 + v_{1\varepsilon}^* + \varepsilon\alpha_1^*) + \varepsilon^s(w_s + v_{s\varepsilon}^* + \varepsilon\alpha_s^*) + \beta_s$ were w_0 denotes the solution of the problem (2), (3), and w_i the solution of the problem (2), (3) with replacement of the right side h by $-\sum_{i=1} L_{2k+j}(w_{l-1}) - \sum_{j-1}^{[i]-1} L_{2k+j-1}(\alpha_j^*)$. Further $[i] = \min(i, 2l)$ $v_{j\varepsilon}^*$ is a function of the type of a boundary layer and α_i^* is a limited function. The remainder β_s is of a corresponding order and small. (No ill...)

ASSOCIATION
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SUBMITTED 1.11.1956
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Card 2/2

LYUSTERNIK, L.A. 20-5-4/67

AUTHOR VISHIK M.I. and LYUSTERNIK L.A., Corresponding Member of the Academy of Sciences of the USSR.

TITLE On Several Elliptic Equations of Even Order Which Contain Small Parameters at the Higher Derivations and Which Degenerate into Equations of First (and in general odd) Order.
(O nekotorykh ellipticheskikh uravneniyakh chetnogo poryadka, soderzhashchikh malyye parametry pri starshykh proizvodnykh i vyrozhdayushchikhsya v uravneniya pervogo (i voobshche nechetnogo) poryadka.- Russian)

PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 113, Nr 5, pp 962-965 (USSR)

ABSTRACT In a preliminary paper the authors of the paper under review investigated the asymptotic behaviour of the solution of the first boundary value problem for the elliptical equations (of even order, with small parameters at the higher derivations). At $\varepsilon = 0$ this solution degenerated into the solution of the first boundary value problem for the elliptical equation of the even lowest order. The paper under review now contains the following: It is possible to apply this method for the investigation of asymptotic behaviour with the corresponding complications also to that case in which the degenerated equation is of odd order.

CARD 1/3

20-5-4/67

On Several Elliptic Equations of Even Order Which Contain Small Parameters at the Higher Derivations and Which Degenerate into Equations of First (and in general odd) Order.

The DIRICHLET Problem for the equation of second order which degenerates into a CAUCHY Problem for an equation of first order.

Because the transition to the case with n dimensions offers no difficulties, the authors of the paper under review limit themselves to the plane case. The alliptical equation under consideration is given explicitly. The paper also defines the "smoothness" p of the parameters of the problem. Also the CAUCHY Problem $L_1 w = h_1 \omega \mid_{\Gamma^+} = 0$ is investigated. The authors construct in the paper under review two recurrence processes under the assumption that the parameters of the problem have the smoothness 2n. The first recurrence process consists in the construction of the functions $w_0 = w, w_1, \ldots, w_{n-1}$, so that at $i > 0$ we have $L_1 w_i = -L_2 w_{i-1}$, $w_i \mid_{\Gamma^+} = 0$. The second recurrence process (which is closely related to the first process) serves the construction of the "boundary layers" which compensate the differences (unevennesses?) in the boundary conditions of the solutions u an w_i on Γ^-. The paper gives the relevant computations and theorems. Finally the paper investigates the equations of higher order. In analogy to above, two recurrence processes are constructed

CARD 2/3

20-5-4/67

On Several Elliptic Equations of Even Order Which Contain Small Parameters at the Higher Derivations and Which Degenerate into Equations of First (and in general odd) Order.

also here. The boundary layer is adjusted (?) already at n = 1. (No reproduction)

ASSOCIATION: not given.
PRESENTED BY: -
SUBMITTED: 3.2. 1957
AVAILABLE: Library of Congress.

CARD 3/3

L. A. Lyusternik

16(1)

AUTHORS: Skoryy, I.A., University Lecturer, and Kopytov, V.D., Scientific Assistant SOV/55-58-2-33/35

TITLE: Lomonosov - Lectures 1957 at the Mechanical-Mathematical Faculty of Moscow State University (Lomonosovskiye chteniya 1957 goda na mekhaniko-matematicheskom fakul'tete MGU)

PERIODICAL: Vestnik Moskovskogo Universiteta, Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 2, pp 241-246 (USSR)

ABSTRACT: The Lomonosov lectures 1957 took place from October 17 - October 31, 1957 and were dedicated the 40-th anniversary of the October revolution.
In the general meeting A.N. Kolmogorov, Academician spoke "On Approximative Representation of Functions of Several Variables by Superposition of Functions With Less Variables and ε-Entropy of Classes of Function". The lecture generalizes the results of Kolmogorov, A.G. Vitushkin, V.I. Arnol'd and V.M. Tikhomirov. The contents has been already published (Doklady Akademii nauk SSSR, 114,5). Professor Kh.A. Rakhmatulin, Member of the Academy of Sciences of the Uz SSR, spoke on "Investigation of the Boundary Layer of the Motion of a two-Component Liquid".
The other lectures were given separately in the sections mechanics and mathematics. The following lectures were given.

8. A.L. Pavlenko, Lecturer : Generalization of the Theory of the Transverse Shock Against a Flexible Thread.
9. A.G. Kulikovskiy, Aspirant : Flow Around Magnetized Bodies by Conducting Liquid.
10. N.V. Yeremeyev, Lecturer : Instruments for the Analysis and Synthesis of Mechanisms.
11. V.S. Lenskiy, Lecturer : Some General Laws in the Behavior of Multiply Loaded Metals.
12. V.D. Klyushnikov, Aspirant : A Variant of the Theory of the Increases of Deformation and Elasto Plastic Stability.
13. Professor M.I. Vishik and Professor L.A. Lyusternik : Asymptotic Behavior of the Solutions of Linear Equations With Small Parameter in the Derivatives.
14. Professor O.A. Oleynik : Some Non-Linear Partial Differential Equations (Survey of the Results of T.D. Ventsel', Chzhou Yuy-lin', N.D. Vvedenskaya, A.S. Kalashnikov, Ye.S. Sabinen, S.L. Kamenomostskaya).
15. Professor M.R. Shura-Bura and P.S. Trifonov, Senior Scientific Assistant : Automatization and Programming.

Card 3/5

10

LYUSTERNIK, L.A. (Moskva)

Calculating the values of a function of one variable. Mat. pros. no.3:63-76 '58. (MIRA 11:9)
(Electronic calculating machines) (Mathematical analysis)

Lyusternik, L.A.

42-1-12/13

AUTHOR: LAPKO, A.F., LYUSTERNIK, L.A.

TITLE: Letter to the Editor (Pis'mo v redaktsiyu)

PERIODICAL: Uspekhi Matematicheskikh Nauk, 1958, Vol 13, Nr 1, p 239 (USSR)

ABSTRACT: This paper contains corrections to the publication on Mathematical Congresses in the Soviet Union (Uspekhi Matematicheskikh Nauk, 1957, Vol.12, Nr.6, pp.47-130).

AVAILABLE: Library of Congress

Card 1/1 1. Mathematics-Errors

LYUSTERNIK, L.A.

"Mathematical education, mathematics, its teaching, application, and history." Reviewed by L. A. Liusternik. Usp.mat.nauk 13 no.2:265-267 Mr-Ap '58. (MIRA 11:4)

(Mathematics)

LYUSTERNIK, L.A.

"Theory of measure and Lebesgue's integral" [in Polish] by S. Hartman and J. Mikusin'ski. Reviewed by L.A. Liusternik. Usp.mat.nauk 13 no.2:267-268 Mr-Ap '58. (MIRA 11:4)

(Integrals, Generalized)
(Mensuration)
(Hartman, S.)
(Mikusin'ski, J.)

SOV/42-13-5-2/15

AUTHORS: Lapko, A.F., and Lyusternik, L.A.

TITLE: Mathematical Congresses and Conferences in the USSR (Matematicheskiye s"yezdy i konferentsii v SSSR)

PERIODICAL: Uspekhi matematicheskikh nauk, 1958, Vol 13, Nr 5, pp 121-166 (USSR)

ABSTRACT: One year ago, on the occasion of the 40th anniversary of the revolution in 1917, the authors [Ref 1] published a survey on the congresses which have taken place in the Soviet Union. Numerous addresses of readers caused the authors to publish the present supplementary report. The paper doubtless valuable for the history of Soviet mathematics, has also a certain interest for the western reader: From the resolutions passed on several congresses appears clearly the effective leading part of the Academy of Sciences which pursues a systematic plan of research projects and which incessantly cares about the performance of them.
There are 90 Soviet references.

Card 1/1

20-119-4-3/59

AUTHOR: Vishik, M.I. and Lyusternik, L.A., Corresponding Member of the Academy of Sciences of the USSR

TITLE: On the Asymptotic Behavior of the Solutions of Partial Differential Equations for Quickly Oscillating Boundary Conditions (Ob asimptotike resheniy zadach s bystro ostsilliruyushchimi granichnymi usloviyami dlya uravneniy s chastnymi proizvodnymi)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 119, Nr 4, pp 636-639 (USSR)

ABSTRACT: The authors consider the first boundary value problem for arbitrary elliptic equations for quickly oscillating boundary conditions. With the aid of the methods formerly published by the authors [Ref 1,2] they do not only obtain the asymptotic behavior of the solutions in the interior of the domain but also in the near of the boundary. The notion "quickly oscillating" is defined in different ways, e.g.: Let a family of functions $\{f_\varepsilon\}$ be given on Γ which depend on the parameter ε. Let this family be called $\frac{1}{\varepsilon}$ - oscillating in the interval $\mu(\varphi_0 \leqslant \varphi \leqslant \varphi_1), \mu \subset \Gamma$, if for each φ of this interval it is

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20-119-4-3/59

On the Asymptotic Behavior of the Solutions of Partial Differential Equations for Quickly Oscillating Boundary Conditions

$$\left| \int_{\varphi_0}^{\varphi} f_{\varepsilon}(\varphi)\, d\varphi \right| < K\varepsilon$$

The family $\{f_{\varepsilon}\}$ is $\frac{1}{\varepsilon}$ - oscillating on the whole Γ, if Γ can be covered with a finite number of intervals ω_i, in each $\{f_{\varepsilon}\}$ of which it is $\frac{1}{\varepsilon}$ - oscillating. There are 3 Soviet references.

SUBMITTED: January 29, 1958

Card 2/2