SUBJECT USSR/MATHEMATICS/Fourier series CARD 1/2 PG - 449
AUTHOR LEVITAN B.M.
TITLE On the derivatives of the spectral function of the Laplace operator.
PERIODICAL Mat. Sbornik, n. Ser. 39, 37-50 (1956)
reviewed 12/1956

Let D be a finite simply connected domain of the n-dimensional Euclidean space $E_N$, let B be the boundary of D. Let $\mu_1^2, \mu_2^2, \dots \mu_n^2, \dots$ be the eigenvalues and $\omega_1(x), \omega_2(x), \dots \omega_n(x), \dots$ (x - point of $E_N$) be the corresponding eigenfunctions of the problem $\Delta u + \mu^2 u = 0$ $\left(\Delta = \frac{\partial^2}{\partial x_1^2} + \dots + \frac{\partial^2}{\partial x_N^2}\right)$, $\left.\frac{\partial u}{\partial n}\right|_B = 0$. The author has obtained the asymptotic formula

$$(1) \qquad \theta(x,y;\mu) = \frac{\mu^{\frac{N}{2}}}{(2\pi)^{\frac{N}{2}} r^{\frac{N}{2}}} I_{\frac{N}{2}}(\mu r) + O(\mu^{N-1}) \qquad (r = |x-y|)$$

Mat. Sbornik, n. Ser. 39, 37-50 (1956) CARD 2/2 PG - 449

(Mat.Sbornik, n. Ser. 35, 267-316(1954)) where $\Theta(x,y;\mu)=\sum_{\mu_n<\mu}\omega_n(x)\,\omega_n(y)$ $(\mu>0)$, $\Theta(x,y;\mu)=-\Theta(x,y;-\mu)$ $(\mu<0)$, $\Theta(x,y;0)=0$. In the present paper he proves that (1) is arbitrarily often differentiable, where every differentiation lets increase the order of the remainder term by one. Finally the differentiation of Fourier series and the summation of Stieltjes' integrals according to Riesz is considered.

INSTITUTION: Moscow.

LEVITAN, B.M.

Correction of the article "Asymptotic behavior of a spectral function and the eigenfunction expansion of the equation $\Delta u + \{\lambda - q(x_1, x_2, x_3)\} u = 0$," (Trudy Mosk.mat.ob-va vol.4, 1955). Trudy Mosk.mat.ob-va 6:481-485 '57. (MIRA 10:11)

(Differential equations, Partial) (Eigenfunctions)

LEVITAN, B.M.; SARGSYAN, I.S.

[redacted] Asymptotic evaluation of eigenfunction derivatives of Schroedinger's equation. Izv. AN Arm. SSR. Ser. fiz.-mat. nauk 10 no.5:19-32 '57. (MIRA 11:2)

1. Voyennaya inzhenernaya artilleriyskaya akademiya im. F.E. Dzerzhinskogo i Institut matematiki AN ArmSSR.
(Eigenfunctions) (Differential equations, Partial)

LEVITAN, B.M.

AUTHOR: LEVITAN, B.M. 38-4-10/10

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

PERIODICAL: Izvestiya Akad.Nauk, Ser.Mat., 1957, Vol.21, Nr 4, pp.599 (USSR)

ABSTRACT: Correction of a figure in the author's paper "On the solution of Cauchy's problem for the equation

$$\Delta u - q(x_1, \dots, x_n)u = \frac{\partial^2 u}{\partial t^2}$$

according to Sobolev's method" (Izvestiya Akad.Nauk 20, 337-376, 1956) and some improvements and additions to §6 of the paper mentioned above.

AVAILABLE: Library of Congress

CARD 1/1

LEVITAN, B.M., (Moskva).

Asymptotic behavior of Green's function and separation into eigenfunctions of Schroedinger's equation. Mat.sbor. 41(83) no.4:439-458 Ap '57. (MIRA 10:7)
(Differential equations, Partial) (Eigenfunctions)

"Differentiation of Eigenfunction Expansion of the Schrödinger Equation," Trudy, t. 7 (Transactions of the Moscow Mathematical Society, v. 7) Moscow, Fizmatgiz, 1958.p 269

The basic results given in this article were presented at the October 4, 1955 session of the Moscow Mathematical Society. The article contains the following sections: Introduction; 1) Solution of Cauchy problem; 2) Evaluation for arbitrary eigenfunctions; 3) Evaluation of derivatives of eigenfunctions in the case of an infinite region; 4) Differentiation of eigen function expansion; 5) The case of $q(x) \to +\infty$ at $|x| \to \infty$ ; References.

AUTHOR: Levitan, B.M. SOV/20-123-1-7/56

TITLE: Lie Theorems for Generalized Translation Operators (Teoremy Li dlya operatorov obobshchennogo sdviga)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 1, pp 32-35 (USSR)

ABSTRACT: Let $V_n$ be a real, n-dimensional, sufficiently often differentiable manifold; let t,s,r,u be points of the $V_n$, $(t_1,\dots,t_n)$ be local coordinates of t etc. An operator $T^s$ defined on a linear space L of functions f(t), $t \in V_n$, is called a translation operator if 1) $T_s$ is linear, 2) there exists an upper neutral element $s = s_o$ so that $T_t^{s_o} f(t) = f(t)$ for all $f(t) \in L$ (i.e. $T^{s_o} = E$), 3) there exists a linear subspace $M \in L$ for all elements f(t) of which $s_o$ is also the neutral lower element, i.e. $T_t^s f(t) \big|_{t=s_o} = f(s)$, 4) $T_s^r T_t^s f(t) = T_t^s T_t^r f(t)$ for all $f(t) \in L$. Furthermore it is assumed that f(t) and $u(s,t) = T_t^s f(t)$ are sufficiently often differentiable with respect to all coordinates. As infinitesimal operators of k-th order for $T^s$ the author denotes

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Lie Theorems for Generalized Translation Operators SOV/20-123-1-7/56

$$L_{k_1,\dots,k_n;t}(f) = \frac{\partial^k u}{\partial s_1^{k_1}\dots\partial s_n^{k_n}}\bigg|_{s=0}, \quad \widetilde{L}_{k_1,\dots,k_n;s}(f) = \frac{\partial^k u}{\partial t_1^{k_1}\dots\partial t_n^{k_n}}\bigg|_{t=0},$$

where $k = k_1+\dots+k_n$, $u(s,t) = T_t^s f(t)$. Differentiating the condition 4) $k_1$ times with respect to $s_1$, $k_2$ tines with respect to $s_2$ etc., and putting $s = 0$, then there follows that $u(r,t)$ satisfies the system

$$\widetilde{L}_{k_1,\dots,k_n;r}u = L_{k_1,k_2,\dots,k_n;t}u$$

(analogue of the first direct Lie theorem).
Theorem: It holds: 1) $L_{k_1,\dots,k_n;s}\, T_t^s f(t) = T_t^s L_{k_1,\dots,k_n;t} f(t)$,

2) $\widetilde{L}_{k_1,\dots,k_n,t}\, T_t^s f(t) = T_t^s \widetilde{L}_{k_1,\dots,k_n;t} f(t)$,

3) $L_{k_1,\dots,k_n;t}\, \widetilde{L}_{j_1,\dots,j_n;t} = \widetilde{L}_{j_1,\dots,j_n;t}\, L_{k_1,\dots,k_n;t}$

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Lie Theorems for Generalized Translation Operators SOV/20-123-1-7/56

Under the assumption that $T_t^s f(t) = \int_{V_n} f(u) d_u \sigma(s,t,u)$, where

the measure $\sigma$ satisfies certain restrictions, the author determins the form of the infinitesimal operators of first and second order.
For two special cases the author gives an analogue of the second Lie theorem for operators of second order.
There are 2 references, 1 of which is Soviet, and 1 French.

PRESENTED: June 27, 1958, by S.L.Sobolev, Academician
SUBMITTED: June 25, 1958

Card 3/3

7/20 123 2-8 5

AUTHOR: Levitan, B.M.

TITLE: Converse Lie Theorems for Generalized Translation Operators (Obratnyye teoremy Li dlya operatorov obobshchennogo sdviga)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 2, pp 243-245 (USSR)

ABSTRACT: The paper contains partly the converse of the Lie theorems for generalized translation operators formulated by the author in [Ref 1]. The author considers the same special cases as in [Ref 1]. Without any proof the author formulates five long theorems on the solvability and uniqueness of Cauchy problems and ... problems (which partly are superdetermined)
There is 1 Soviet reference

PRESENTED: June 27, 1958, by ... Academician

SUBMITTED: June 25, 1958

Card 1/1

SOV/20-123-3-4/54

AUTHOR: Levitan, B.M.

TITLE: Adjoint Operators of Generalized Translation (Sopryazhennyye operatory obobshchennogo sdviga)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 3, pp 401 - 404 (USSR)

ABSTRACT: Let $V_n$ be a real differentiable manifold and let $T^s$ be the generalized translation operators defined on $V_n$ according to [Ref 1]. Furthermore let m(E) be a completely additive measure on $V_n$. The adjoint operators $\widetilde{T}^s$ are defined by

$$\int_{V_n} T_t^s f(t)\overline{g(t)}dm(t) = \int_{V_n} f(t)\overline{\widetilde{T}_t^s g(t)}\, dm(t)$$

The author considers the case II of [Ref 1] : $u(s,t)=T_t^s f(t)$ is the solution of the Cauchy problem

$$\widetilde{N}_{\alpha;s}\, u = N_{\alpha;t}\, u\ ,\quad u\Big|_{s=0} = f(t)\ ,\quad \frac{\partial^{\lambda} u}{\partial s_1^{\lambda_1}\dots\partial s_n^{\lambda_n}}\Bigg|_{s=0} = h_{\lambda_1,\dots,\lambda_n} f(t)$$

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Adjoint Operators of Generalized Translation SOV/20-123-3-4/54

where $\widetilde{N}_{\alpha,s}$ and $N_{\alpha,t}$ ($\alpha = 1,2,\ldots,n$) are differential operators of second order. Let $N^{*}_{\alpha,t}$ be the operators adjoint to $N_{\alpha,t}$ with regard to the measure m . Theorem: With the given notations it holds : The function $v(s,t) = \widetilde{T}_t^s\, g(t)$ is the unique solution of the Cauchy problem

$$\widetilde{N}_{\alpha,s} v = N^{*}_{\alpha,t} v \;;\; v\Big|_{s=0} = g(t)\;;\; \frac{\partial^{\lambda} v}{\partial s_1^{\lambda_1}\ldots\partial s_n^{\lambda_n}}\Bigg|_{s=0} = \bar{h}_{\lambda_1,\ldots,\lambda_n} g(t)$$

where $\widetilde{N}_{\alpha,s}$ are operators with complex-conjugate coefficients. Theorem: In order that the adjoint operators satisfy the condition

$$\widetilde{T}_s^r\, T_t^s f(t) = T_t^s\, \widetilde{T}_t^r f(t)$$

it is necessary and sufficient that for an arbitrary function f( ) the condition

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$$N^{*}_{\alpha;s} \; T_{t}^{s} \, f(t) = T_{t}^{s} \, N^{*}_{\alpha;t} \, f(t)$$

is satisfied.

The author thanks I.M. Gel'fand for the discussion of some results.

PRESENTED: June 27, 1958, by S.L. Sobolev, Academician

SUBMITTED: June 25, 1958

LEVITIN, B.M.

16(1) PHASE I BOOK EXPLOITATION SOV/2660

Vsesoyuznyy matematicheskiy s"yezd. 3rd, Moscow, 1956

Trudy. t. 4: Kratkoye soderzhaniye sektsionnykh dokladov. Doklady inostrannykh uchenykh (Transactions of the 3rd All-Union Mathematical Conference in Moscow. vol. 4: Summary of Sectional Reports. Reports of Foreign Scientists) Moscow, Izd-vo AN SSSR, 1959. 247 p. 2,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Matematicheskiy institut.

Tech. Ed.: G.N. Shevchenko; Editorial Board: A.A. Abramov, V.G. Boltyanskiy, A.M. Vasil'yev, B.V. Medvedev, A.D. Myshkis, S.M. Nikol'skiy (Resp. Ed.), A.G. Postnikov, Yu. V. Prokhorov, K.A. Rybnikov, P. L. Ul'yanov, V.A. Uspenskiy, N.G. Chetayev, G. Ye. Shilov, and A.I. Shirshov.

PURPOSE: This book is intended for mathematicians and physicists.

COVERAGE: The book is Volume IV of the Transactions of the Third All-Union Mathematical Conference, held in June and July 1956. The book is divided into two main parts. The first part contains summaries of the papers presented by Soviet scientists at the Conference that were not included in the first two volumes. The second part contains the text of reports submitted to the editor by non-Soviet scientists. In those cases when the non-Soviet scientist did not submit a copy of his paper to the editor, the title of the paper is cited and, if the paper was printed in a previous volume, reference is made to the appropriate volume. The papers, both Soviet and non-Soviet, cover various topics in number theory, algebra, differential and integral equations, function theory, functional analysis, probability theory, topology, mathematical problems of mechanics and physics, computational mathematics, mathematical logic and the foundations of mathematics, and the history of mathematics.



Card 7/34

LEVITAN, B. M.

16(1) PHASE I BOOK EXPLOITATION SOV/2660

Vsesoyuznyy matematicheskiy s"yezd. 3rd, Moscow, 1956

Trudy. t. 4: Kratkoye soderzhaniye sektsionnykh dokladov. Doklady inostrannykh uchenykh (Transactions of the 3rd All-Union Mathematical Conference in Moscow. vol. 4: Summary of Sectional Reports. Reports of Foreign Scientists) Moscow, Izd-vo AN SSSR, 1959. 247 p. 2,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Matematicheskiy institut.

Tech. Ed.: G.N. Shevchenko; Editorial Board: A.A. Abramov, V.G. Boltyanskiy, A.M. Vasil'yev, B.V. Medvedev, A.D. Myshkis, S.M. Nikol'skiy (Resp. Ed.), A.G. Postnikov, Yu. V. Prokhorov, K.A. Rybnikov, P. L. Ul'yanov, V.A. Uspenskiy, N.G. Chetayev, G. Ye. Shilov, and A.I. Shirshov.

PURPOSE: This book is intended for mathematicians and physicists.

COVERAGE: The book is Volume IV of the Transactions of the Third All-Union Mathematical Conference, held in June and July 1956. The book is divided into two main parts. The first part contains summaries of the papers presented by Soviet scientists at the Conference that were not included in the first two volumes. The second part contains the text of reports submitted to the editor by non-Soviet scientists. In those cases when the non-Soviet scientist did not submit a copy of his paper to the editor, the title of the paper is cited and, if the paper was printed in a previous volume, reference is made to the appropriate volume. The papers, both Soviet and non-Soviet, cover various topics in number theory, algebra, differential and integral equations, function theory, functional analysis, probability theory, topology, mathematical problems of mechanics and physics, computational mathematics, mathematical logic and the foundations of mathematics, and the history of mathematics.



Card 10/ 34

69755

S/043/60/000/02/06/011

16.6100

AUTHOR: Levitan, B.M.

TITLE: On a Class of Solutions of the Equation of Kolmogorov-Smolukhovskiy

PERIODICAL: Vestnik Leningradskogo universiteta, Seriya matematiki, mekhaniki i astronomii, 1960, No.2, pp 81-115

TEXT: The present paper is a detailed representation of the results announced by the author in (Ref.8) and contains some generalizations of the results of Kolmogorov (Ref.1,3) in a special case. The author has reported on the paper in 1950 at the Meeting of the Moscow Mathematical Society. There are 9 theorems and 14 lemmas.
There is 1 figure and 9 references: 7 Soviet, 1 French and 1 Italian.

X

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16.3400, 16.3500

77724

SOV/42-15-1-1/27

AUTHORS: Levitan, B. M., Sargsyan, I. S.

TITLE: Some Problems in the Theory of Sturm-Liouville's Equation

PERIODICAL: Uspekhi matematicheskikh nauk, 1960, Vol 15, Nr 1, pp 3-98 (USSR)

ABSTRACT: The paper deals extensively with problems associated with eigenfunction expansion of the equation

$$y'' + (\lambda - q(x))\, y = 0, \qquad (0.1)$$

defined on a finite or infinite interval $(a, b)$, where $q(x)$ is summable in every interval $[a', b']$, $a < a' < b' < b$. The methods usually used in the study of this problem are methods of integral equations and of this problem are methods of integral equations and contour integration. In this paper the authors present a completely new method by which some theorems are derived concerning not only the eigenfunction

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expansion of (0.1) but also expansions in terms of derivatives of eigenfunctions. The general outline of the method is as follows, assuming for simplicity that the spectrum of (0.1) is discrete. Let $\lambda_1, \lambda_2, \ldots, \lambda_n, \ldots$ ($\lambda_n \to \infty$ as $n \to \infty$) be the eigenvalues of (0.1) and $\psi_1, \psi_2, \ldots, \psi_n, \ldots$ be the corresponding eigenfunctions. Together with (0.1) consider the Cauchy problem.

$$\frac{\partial^2 u}{\partial x^2} - q(x) u = \frac{\partial^2 u}{\partial t^2}. \tag{0.2}$$

$$u|_{t=0} = f(x), \quad \left.\frac{\partial u}{\partial t}\right|_{t=0} = 0, \tag{0.3}$$

where f(x) is sufficiently smooth. The solution to problem (0.2) - (0.3) by Fourier method is



$$u(x, t) = \sum_{n=1}^{\infty} c_n \psi_n(x) \cos \mu_n t, \quad \mu_n = \sqrt{\lambda_n}, \tag{0.4}$$

where $$c_n = \int_0^\pi f(x)\psi_n(x)\,dx,$$

and by Riemann's method it is

$$u(x, t) = \frac{1}{2}\{f(x+t) + f(x-t)\} + \frac{1}{2}\int_{x-t}^{x+t} w(x, t, s) f(s)\,ds, \qquad (0.5)$$

where w(x, t, s) is the so-called Riemann function of the problem. Since the solution is unique one can equate (0.4) and (0.5) and introducing the step-function

$$\sum_{n=1}^{\infty} c_n\psi_n(x)\cos\mu_n t = \frac{1}{2}\{f(x+t) + f(x-t)\} + \frac{1}{2}\int_{x-t}^{x+t} w(x, t, s) f(s)\,ds \qquad (0.6)$$

$$S(x, \mu) = \sum_{\mu_n < \mu} c_n\psi_n(x),$$

results in

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$$\int_0^\infty \cos\mu t\, d_\mu S(x, \mu) = \frac{1}{2}\{f(x+t) + f(x-t)\} + \frac{1}{2}\int_{x-t}^{x+t} w(x, t, s) f(s)\,ds \qquad (0.7)$$

where the left side is the Fourier-Stieltjes transform of $S(x, \mu)$. For small t the right side of (0.7) is well known and thus also the transform of $f(x, \mu)$. Using this fact and some Tauberian theorems for Fourier integrals it is possible to obtain refined results on convergence of eigenfunction expansion of (0.1). Specifically it is possible to prove a theorem on convergence of the eigenfunction expansion of $f(x)$ and its development in terms of the Fourier integral. This gives a final answer to the expansion of a square integrable function in terms of eigenfunctions. This is also applicable to the investigation of asymptotic behavior of the spectral function of (0.1). Of particular interest is the case when (0.1) is given in the interval $(0, \infty)$ and $q(x) \to +\infty$ as $x \to \infty$. Under this assumption the spectrum of (0.1) is a point-spectrum and the eigenfunctions decrease exponentially. Thus for the existence of the Fourier coefficients it is not necessary to assume that $f \in L^2(0,\infty)$ and hence that the series

$$\sum_{n=1}^{\infty} c_n^2$$

converges. The authors present two different derivations of (0.5) and also give justification for using Fourier methods on equation (0.2). The paper is divided into four chapters: (1) deals with the Cauchy problem for one-dimensional wave equation. Solutions for the semi-infinite and finite intervals are given. Chapters (2) and (3) investigate the problem of eigenfunction expansion. Here estimates for the spectral function of (0.1) are given for the straight line $(-\infty, \infty)$ as are also its asymptotic behavior, as well as the behavior of its derivative, on both the infinite and semi-infinite line. The main result of this section is the following:

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Theorem [illegible].1: Let $q(x)$ be a summable function in every finite interval and let $f(x) \in L^2$ ( [illegible] ). Then, uniformly in every finite interval the following holds:

$$\lim_{\mu \to \infty} \left\{ \int f(s)\theta_1(x, s; \mu)\, ds - \frac{1}{\pi} \int f(s) \frac{\sin \mu (x - s)}{x - s}\, ds \right\} = \int f(s)\theta(x, s; [illegible])\, ds,$$

i.e. the difference of the expansion in terms of the eigenfunctions of the Sturm-Liouville operator and the expansion in terms of the Fourier integral tends to zero uniformly in every finite interval. Here $\theta(x, s, \mu)$ is the spectral function of (0.1) and $\theta_1(x, s, \mu)$ is the spectral function of a modified problem. Chapter (4) examines the eigenfunction expansion for the case $q(x) \to -\infty$. As before convergence, asymptotic behavior and estimates for Green's function are investigated. Using Tauberian theorems the following theorem on the distribution

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of eigenvalues is proven:

Theorem 4.4.1: Let $q(x)$ satisfy the following conditions

$1^{\circ}$ for $r = |\xi - x| \leq 1$

$$r = |\xi - x| \leq 1$$

$$|q(\xi) - q(x)| \leq C r |q(x)|^{a}, \tag{4.2.2}$$

where $0 \leq a < 3/2$

$2^{\circ}$ for $r \leq 1$

$$q(\xi) \leq C q(x). \tag{4.2.3}$$

$3^{\circ}$ for $r \geq 1$

$$q(\xi) \leq C e^{\frac{1}{2} r \sqrt{q(x)}}. \tag{4.2.4}$$

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4° There exists a constant $A > 0$ such that

$$\int_0^\infty \frac{dx}{[q(x)]^A} < +\infty. \qquad (4.2.5)$$

Introduce the monotonic function of $\lambda$

$$\sigma(\lambda) = \mathrm{mes}\,\{q(x) < \lambda\}$$

and let

$$\psi_\varepsilon(\lambda) = \int_0^\lambda (\lambda - \nu)^{1/2} \nu^\varepsilon \, d\sigma(\nu).$$

Assume that there exist positive constants $\alpha$ and $\beta$ such that for sufficiently large $\lambda$ the inequality

$$\alpha\psi_\varepsilon(\lambda) < \lambda\psi'_\varepsilon(\lambda) < \beta\psi_\varepsilon(\lambda). \qquad (4.4.1)$$

is satisfied. Then for $\lambda \longrightarrow \infty$

$$\sum_{\lambda_n<\lambda} a_n^{(\tau)} \sim \frac{1}{\pi}\int_0^{\lambda} (\lambda - \nu)^{1/2}\nu^{\tau}\, d\sigma(\nu) - \frac{1}{\pi}\int_{q(x)<\lambda} q^{\tau}(x)[\lambda - q(x)]^{1/2}\, dx, \qquad (4.4.2)$$

where

$$a_n^{(\tau)} = \int_0^{\pi} q^{\tau}(x)\varphi_n^2(x)\, dx$$

There are 29 references, 3 U.S., 6 U.K., and 20 Soviet. The most recent U.S. and U.K. references are: E. C. Titchmarsh, Some properties of eigenfunction expansions, Quart. Journ. of Math., Oxford (2) 5 (1954) 59-70; E. C. Titchmarsh, Eigenfunction expansions associated with partial differential equations (III), Proc. London Math. Soc (3) 3, No 10 (1953) 153-159; J. S. Wett, F. Mandl, On the asymptotic distribution of eigenvalues, Proc. Royal Soc. A200 (1950) 572-580; E. A. Coddington, N. Levinson, Theory of ordinary differential equations (Russian translation of English language book) (1958);

Some problems in the Theory of Sturm-Liouville's Equation

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R. Courant, D. Hilbert, Methods of mathematical physics, Vol 2 (Russian translation)(1951).

SUBMITTED: March 3, 1959

Card 10/10

S/044/63/000/001/028/053
A060/A000

AUTHOR: Levitan, B.M.

TITLE: Lie theorems for generalized displacement operators

PERIODICAL: Referativnyy zhurnal, Matematika, no. 1, 1963, 73, abstract 1B346 (In collection "Issled. po sovrem. probl. teorii funktsiy kompleksn. peremennogo". Moscow, Fizmatgiz, 1961, 93 - 100)

TEXT: Let V be an n-dimensional differentiable manifold; L - some linear space of smooth functions on V. Assume that to every point $s \in V$ there corresponds a linear operator $T^s$ in L, and the following conditions are fulfilled: there exists a point $0 \in V$ so that $T^0 = E$; $T_s^r T_t^s f(t) = T_t^s T_t^r f(t)$ $(f \in L)$; the function $u(s, t) = T_t^s f(t)$ $(f \in L)$ is smooth. The operators $T^s$ are called generalized displacement operators. An example of such a family of operators are right displacements on a Lie group. Infinitesimal operators of order k for the operators $T^s$ are operators

$$L_{k_1, \ldots, k_n; t}(f) = \left. \frac{\partial^k u}{\partial s_1^{k_1} \ldots \partial s_n^{k_n}} \right|_{s=0},$$

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Lie theorems for generalized displacement operators S/044/63/000/001/028/053 A060/A000

$$\tilde{L}_{k_1,\dots,k_n;s}(f) = \left.\frac{\partial^k u}{\partial t_1^{k_1} \dots \partial t_n^{k_n}}\right|_{t=0} \quad (k_1 + \dots + k_n = k).$$

The function $u(s, t)$ satisfies the equations $\tilde{L}_{k_1, \dots, k_n;s}u = L_{k_1,\dots,k_n;t}u$.

The author considers the case when $T_t^s f(t) = \int_V f(u)\, d_u\, \sigma(s, t, u)$, where

$\sigma(s, t\, E)$ is a function of the points s, t and the set E. It is demonstrated that under some constraints upon the measure $\sigma(s, t, E)$ the infinitesimal operators of order k are differential operators of order k. The following theorem is proven, being an analogous of the converse to Lie's second theorem. Let there be given families of differential operators $L_{\alpha\beta}$ and $\tilde{L}_{\alpha\beta}$ with analytic coefficients, so that the spaces stretched over these families are invariant with respect to commutation. Let f and $g_i$ be analytic functions on V. Then the Cauchy problem for the system $\tilde{L}_{\alpha\beta;s}\, u = L_{\alpha\beta;t}\, u$ with the initial conditions

$$u\big|_{s=0} = f(t), \quad \left.\frac{\partial u}{\partial s_i}\right|_{s=0} = g_i(t)$$

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has a unique solution in the class of analytic functions. Further, let $g_i(t) = h_i f(t)$, where $h_i$ are constants, let $L_{\alpha\beta}$ and $\tilde{L}_{\gamma\delta}$ be nonpermutable and

$$\tilde{L}_{\alpha\beta;t} f(t)\Big|_{t=0} = L_{\alpha\beta;t} f(t)\Big|_{t=0},$$

$$\frac{\partial}{\partial t_\theta} \tilde{L}_{\alpha\beta;t} f(t)\Big|_{t=0} = \frac{\partial}{\partial t_\nu} L_{\alpha\beta;t} f(t)\Big|_{t=0}.$$

Then the solution of the Cauchy problem defines a family of generalized displacement operators.

A.L. Onishchik

[Abstracter's note: Complete translation]

S/042/61/016/004/001/005
C111/C444

AUTHOR: Levitan, B. M.

TITLE: Lie theorems for the operators of uniform shear

PERIODICAL: Uspekhi matematicheskikh nauk, v. 16, no. 4, 1961, 3-30

TEXT: Contents: Introduction, § 1 Group ring. § 2 Generalisation of group ring and operators of uniform shear. § 3 Definition of infinitesimal operators and the first direct theorem of Lie for the operators of uniform shear. § 4 The second and the third direct theorem of Lie for operators of uniform shear. The case of infinitesimal first order operators. § 5 The second and the third direct theorem of Lie for operators of uniform shear. The case of infinitesimal second order operators. § 6 The first converse of the Lie theorem for operators of uniform shear. § 7 Description of the class D. § 8 The second converse of the Lie theorem for operators of uniform shear. § 9 The third converse of the Lie theorem for operators of uniform shear. § 10 The construction of the operators $X_{\alpha, t}$, commutating with the operators $X_{\alpha, t}$. § 11 Canonical operators. § 12 Transformation operators. § 13 Several

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questions on convergence. § 14 Finite dimensional subspaces, being invariant with respect to the infinitesimal operators (Analogue of the theorem of representation for operators of uniform shear). § 15 Examples

The paper contains only a connected representation of the results and here and there a hint at the proofs. A detailed representation is advertised in Trudy Moskovskogo matematicheskogo obshchestva (Papers of the Moskow Mathematical Society) volume 11, 1962.

As operators of uniform shear one denotes such operators $T^s$, $s \in \Omega$, with $\Omega$ being a topological space, which are defined on a linear space E of numerical functions $f(t)$, $t \in \Omega$, and satisfy the conditions: 1.) They are linear 2.) there exists a neutral element $s_o \in \Omega$ such that (2.6) $T^{s_o} f(t) = f(t)$ and 3.) for arbitrary s, $r \in \Omega$ and $f(t) \in E$ holds (2.5) $T^r_s T^s f(t) = T^s_t T^r f(t)$.

The structure of the operators $T^s$ is investigated by aid of the conception of the infinitesimal operators. In the following one assumes that $\Omega$ is a differentiable or analytic manifold of the dimension n (e.g. a Lie group), and that the function $u(s,t) = T^s f(t)$ is analytic in the coordinates $(s_1, s_2, \ldots, s_n; t_1, \ldots, t_n)$, if $f(t)$ is analytic in $(t_1, t_2, \ldots, t_n)$. As infinitesimal operators of the order $k = k_1 + k_2 + \ldots + k_n$ the following linear operators are denoted:

$$L_{k_1,\ldots,k_n;t}(f) = \left.\frac{\partial^k u}{\partial s_1^{k_1} \ldots \partial s_n^{k_n}}\right|_{s=0} . \qquad (3.1)$$

$$\tilde{L}_{k_1,\ldots,k_n;s}(f) = \left.\frac{\partial^k u}{\partial t_1^{k_1} \ldots \partial t_n^{k_n}}\right|_{t=0} . \qquad (3.2)$$

If (2.5) is differentiated $k_1$-times in respect to $s_1$, $k_2$-times in respect to $s_2$ etc., and if $s = 0$, then in analogy to the first direct Lie theorem, the following system is obtained:

$$\tilde{L}_{k_1, \ldots, k_n; r}(u) = L_{k_1, \ldots, k_n; t}(u). \qquad (3.8).$$

Under a shear on a group, u is uniquely determined by the infinitesimal operators of first order. Under a uniform shear the infinitesimal operators of first order usually are found to be linear dependant such that one has to admit infinitesimal operators of higher order. The author confines to cases where the uniform shear is solely determined by its infinitesimal operators of first or second order. In that way the Lie theorems are generalized separately for the first case (§4) and the second case (§5); e g in the first case:

Let

$$L_{\alpha; t}(f) = \left.\frac{\partial u}{\partial s_{\alpha}}\right|_{s=0} , \qquad (4.1)$$

$$\ddot{L}_{\alpha; s}(f) = \left.\frac{\partial u}{\partial t_{\alpha}}\right|_{t=0} , \qquad (4.2)$$

S/042/61/016/004/001/005
C111/C444

Lie theorems for the operators ...

where $u(s,t) = T^s f(t)$ and let $[A, B] = AB - BA$. The generalization of the second Lie theorem is

Theorem 4.1: Let the condition

$$\tilde{L}_{\alpha;s} \tilde{L}_{\beta;s} (f) \Big|_{s=0} = \left( \frac{\partial^2 f}{\partial s_\alpha \partial s_\beta} + a^\lambda_{\alpha\beta} \frac{\partial f}{\partial s_\lambda} \right) \Big|_{s=0} , \qquad (4.5)$$

be satisfied, where $a^\lambda_{\alpha\beta}$ are constants. Then for every function $f(t)$ having second order derivatives, the relation

$$\left[ L_{\alpha;t}, L_{\beta;t} \right] (f) = c^\lambda_{\alpha\beta} L_{\lambda;t}(f) \qquad (4.6)$$

holds, where $c^\lambda_{\alpha\beta}$ are constants.

If (4.5) is satisfied, and if the $L_{\alpha;t}$ are linear independant, then the following relations hold in generalization of the third theorem:

$$c^\lambda_{\alpha\beta} = - c^\lambda_{\alpha\beta} \quad (\alpha, \beta, \lambda = 1, 2, \ldots, n) \qquad (4.9)$$

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$$c^{\lambda}_{\alpha\beta} c^{\sigma}_{\lambda\gamma} + c^{\lambda}_{\beta\gamma} c^{\sigma}_{\lambda\alpha} + c^{\lambda}_{\gamma\alpha} c^{\sigma}_{\lambda\beta} = 0 \quad (\alpha, \beta, \gamma, \sigma = 1, 2, \ldots, n) \qquad (4.10)$$

(Theorem 4.2)

Adjoining to the generalization of the direct theorems the converse of the problem is considered: Let (3.8) be an compatible system, possessing a unique solution for certain initial conditions; under which additional suppositions will this solution be an operator of uniform shear? Sufficient conditions are given. A number of questions in connection with the developed theory is considered, especially there are introduced certain most simple canonical operators, corresponding to the canonical coordinates of second order in the case of Lie groups (compare with L. S. Pontryagin, continuous groups). Two examples are considered.

There are 2 Soviet-bloc references and 1 non-Soviet-bloc reference.

SUBMITTED: March 10, 1961

Card 6/6

APPROVED FOR RELEASE: 07/12/2001 CIA-RDP86-00513R000929620010-2"

S/042/61/016/004/002/005
C111/C444

AUTHOR: Levitan, B. M.

TITLE: On a theorem of Titchmarsh and Sears

PERIODICAL: Uspekhi matematicheskikh nauk, v. 16, no. 4, 1961, 175-178

TEXT: In the whole space $R_n$ the Schrödinger operator

$$Lu = -\Delta u + q(x_1, \dots, x_n)\, u \qquad (1)$$

be considered, where $q(x_1, \dots, x_n)$ is real and continuous. Let $\theta(x, y, \lambda)$ be the spectral function of (1) and $R(x, y, z)$ the corresponding resolvent

$$R(x, y; z) = \int_{-\infty}^{\infty} \frac{d_\lambda \theta(x, y; \lambda)}{\lambda - z} . \qquad (2)$$

E. C. Titchmarsh (Ref. 1: On the uniqueness of the Green's function associated with a second-order differential equation, Canad. J. Math. 1 (1949), 191-198) has shown: if

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On a theorem of Titchmarsh and Sears S/042/61/016/004/002/005
C111/C444

$$q(x) \geqslant -Ar^2 - B \tag{3}$$

where $x \in R_n$, $r = |x|$, A,B are positive constants, then (1) possesses a unique resolvent.

D. B. Sears (Ref. 2: Note on the uniqueness of Green's functions associated with certain differential equations, Canad. Math. 2 (1950), 314-325) improved this result by pointing out that the right hand of (3) may be replaced by a function $-Q(r)$ which has to satisfy certain demands.

The author gives a new proof of the mentioned results of [Ref. 1,2]. The proof is based on the estimation of the order of increase of the solution of the Cauchy problem

$$\Delta u - q(x)\, u = \frac{\partial^2 u}{\partial t^2}, \tag{5}$$

$$u\Big|_{t=0} = f(x), \quad \frac{\partial u}{\partial t}\Big|_{t=0} = 0 \tag{6}$$

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where $f(x) \in L_2(R_n)$, for a fixed x and $t \to \infty$, and on the theorem of uniqueness from B. M. Levitan, N. N. Meyman (Ref. 3: O teoreme yedinstvennosti [On the theorem of uniqueness] DAN 81, no. 5 (1951), 729-731).

There are 2 Soviet-bloc and 2 non-Soviet-bloc references. The two references to English-language publication read as follows: E. C. Titchmarsh, On the uniqueness of the Green's function associated with a second-order differential equation, Canad. J. Math. 1 (1949), 191-198. D. B. Sears, Note on the uniqueness of Green's functions associated with certain differential equations, Canad. Math. 2 (1950), 314-325.

SUBMITTED: January 4, 1960

LEVITAN, Boris Moiseyevich; SMOLYANSKIY, M.L., red.; YERMAKOVA, Ye.A., tekhn. red.

[Generalized displacive operators and some of their applications] Operatory obobshchennogo sdviga i nekotorye ikh primeneniia. Moskva, Gos. izd-vo fiziko-matem.lit-ry, 1962. 323 p. (MIRA 15:5)

(Operators (Mathematics))

DEMIDOVICH, Boris Pavlovich; MARON, Isaak Abramovich; SHUVALOVA, Emma Zinov'yeva; LEVITAN, B.M., prof., retsenzent; SMOLITSKIY, Kh.L., prof., retsenzent; BIRYUK, G.I., red.; AKHLAMOV, S.N., tekhn. red.

[Numerical methods of analysis; approximation of functions, differential equations] Chislennye metody analiza; priblizhenie funktsii, differentsial'nye uravneniia. Pod red. B.P. Demidovicha. Moskva, Gos. izd-vo fiziko-matem. lit-ry, 1962. 367 p. (MIRA 15:4)
(Functions) (Differential equations)

LEVITAN, B.M.

Lie's theorems for generalized displacive operators.
Trudy Mosk. mat. ob-va 11:128-197 '62. (MIRA 15:10)
(Operators (Mathematics))

40283

S/020/62/146/001/001/016
B112/B108

AUTHOR: Levitan, B. M.

TITLE: Continuation of solutions to partial differential equations

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 1, 1962, 30 - 33

TEXT: The elliptic equation $a(x,y)\partial^2u/\partial y^2 + b(x,y)\partial u/\partial y + c(x,y)u + \alpha(x)\partial^2u/\partial x^2 + \beta(x)\partial u/\partial x + f(x,y) = 0$ (8) is considered in a convex domain $D^+$ of the upper semiplane, which contains an interval $\sigma$ of the x-axis. It is demonstrated that each solution satisfying the boundary condition $(\partial u/\partial y - hu)|_{y=0} = 0$ can be continued throughout the interval $\sigma$ if the equation (8) has analytic coefficients. The continuation is performed by means of transformation operators. There is 1 figure.

PRESENTED: April 2, 1962, by I. G. Petrovskiy, Academician

SUBMITTED: March 27, 1962

Card 1/1

GUTER, R.S.; KUDRYAVTSEV, L.D.; LEVITAN, B.M.; UL'YANOV, P.L., red.; LYUSTERNIK, L.A., red.; YAMPOL'SKIY, A.R., red.; GAPOSHKIN, V.F., red.; KOPYLOVA, A.N., red.; PLAKSHE, L.Yu., tekhn. red.

[Elements of the theory of functions; functions of real variables, approximation of functions; almost periodic functions] Elementy teorii funktsii; funktsii deistvitel'nogo peremennogo, priblizhenie funktsii, pochti-periodicheskie funktsii. Moskva, Fizmatgiz, 1963. 244 p. (MIRA 16:12)

(Functions)

L 10610-63 EWT(d)/FCC(w)/BDS AFFTC IJP(C)

ACCESSION NR: AP3000733 S/0020/63/150/003/0474/0476

AUTHOR: Levitan, B. M. 51

TITLE: Determination of a Sturm-Liouville differential equation 16 over two spectra

SOURCE: AN SSSR. Doklady, v. 150, no. 3, 1963, 474-476

TOPIC TAGS: Sturm-Liouville differential equation

ABSTRACT: The problem of constructing a Sturm-Liouville differential equation over two spectra was engaged by M. G. Krayn (DAN, 76, 345, 1951). In the present work the author gives a different solution to this problem. This method allows him to state necessary and sufficient conditions for two sequences of real numbers to be two spectra over a Sturm-Liouville differential equation. Orig. art. has: 7 equations.

ASSOCIATION: none

SUBMITTED: 22Dec62 DATE ACQD: 21Jun63 ENCL: 00

SUB CODE: 00 NO REF SOV: 003 OTHER: 001

Card 1/1

L 15472-63 EWT(d)/FCC(w)/BDS AFFTC/IJP(C)
ACCESSION NR: AP3005425 S/0020/63/ 151/005/1014/1017

AUTHORS: Gasy*mov, M. G.; Levitan, B. M. 53

TITLE: Sum of the differences of the eigenvalues of two singular Sturm-Liouville operators 16

SOURCE: AN SSSR. Doklady*, v. 151, no. 5, 1963, 1014-1017

TOPIC TAGS: eigenvalue, difference sum, perturbation, Sturm-Liouville operator, boundary condition

ABSTRACT: This is a continuation of a study carried out by M. G. Gasy*mov (DAN, no. 5, 1963, p. 150) wherein a formula was proposed for the case of two singular Sturm-Liouville operators with discrete spectra differing from each other only by finite perturbation. Authors studied the sum of the differences of the eigenvalues of two singular Sturm-Liouville operators which differed from each other by boundary conditions and finite perturbation. An analogue for Gasy*mov's formulas was obtained and some necessary conditions were proven so that the two sequences of numbers $\{\lambda_n\}$ and $\{\mu_n\}$ were eigenvalues of one singular Sturm-Liouville equation but with different boundary conditions. Three theorems are proved. Orig. art. has: 23 formulas.

Card 1/2

LEVITAN, B.M.

Letter to the editor. Usp. mat. nauk 18 no.4:239 Jl-Ag '63.
(MIRA 16:9)

GASYMOV, M.G.; LEVITAN, B.M.

Sum of differences between the eigenvalues of two singular Sturm-Louiville operators. Dokl. AN SSSR 151 no.5:1014-1017 Ag '63. (MIRA 16:9)

1. Predstavleno akademikom I.G.Petrovskim.
(Operators (Mathematics))

LEVITAN, B.M.

Calculation of the regularized trace for a Sturm-Louiville operator. Usp.mat.nauk 19 no. 1:161-165 Ja-F '64. (MIRA 17:6)

S/0042/64/019/002/0003/0063

ACCESSION NR: AP4031754

AUTHORS: Levitan, B. M.; Gasy*mov, M. G.

TITLE: Determination of a differential equation from two spectra

SOURCE: Uspekhi matematicheskikh nauk, v. 19, no. 2, 1964, 3-63

TOPIC TAGS: differential equation, spectral function, differential equation determination, differential operator, linear integral equation, Parseval equality, Sturm Liouville equation, asymptotic formula, Sturm Liouville operator

ABSTRACT: Section titles are:

I. Determination of a differential equation from its spectral function
1. On the spectral function of a differential operator
2. Derivation of a linear integral equation for the kernel K(x,t)
3. Inverse problem. Solvability of the integral equation for the kernel K(x,t)
4. Derivation of the differential equation
5. Parseval equality
6. Classic Sturm-Liouville problem

Card 1/5

ACCESSION NR: AP4031754

II. Determination of a regular Sturm-Liouville equation from two spectra
1. Expression of normalization numbers in terms of the spectrum
2. Asymptotic formulas for the numbers $\alpha_n$
3. Inverse Sturm-Liouville problem

III. Determination of the singular Sturm-Liouville problem from two spectra
1. Formulas for the differences of traces of two Sturm-Liouville operators for various boundary conditions at zero
2. Expression of the numbers $\alpha_n(h_1)$ in terms of the spectrum
3. One class of potentials
4. Solution of the inverse problem for the class $\Omega_{\frac{1}{4}}$

Application I. Proof of a theorem of V. A. Ambartsumyan
Application II. Derivation of asymptotic formulas (1.6.6) and (1.6.7)

Given two sequences of real numbers $\lambda_0, \lambda_1, \ldots, \lambda_n, \ldots; \mu_0, \mu_1, \ldots, \mu_n, \ldots$ the authors treat the problem of finding necessary and sufficient conditions for these sequences to be two spectra of one Sturm-Liouville operator of the form

$$y'' + (\lambda - q(x))y = 0 \quad (0 < x < b < \infty), \qquad (1)$$

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ACCESSION NR: AP4031754

under various boundary conditions. Here $q(x)$ is a real function which is summable on each interval $(0,b')$, $b' < b$. In the first section the authors find a solution of the inverse Sturm-Liouville problem from the spectral function, based on the following: Let $\rho(\lambda)$ be the spectral function of the problem

$$y'' + (\lambda - q(x))y = 0, \quad 0 < x < \infty; \tag{2}$$

$$y(0) = 1, \quad y'(0) = h, \tag{3}$$

where $q(x)$ is a real function having local symmetry of arbitrary order $m$, and $h$ is a real number. Set

$$\sigma(\lambda) = \begin{cases} \rho(\lambda), & \lambda \le 0 \\ \rho(\lambda) - \frac{2}{\pi}\sqrt{\lambda}, & \lambda > 0. \end{cases} \tag{4}$$

Then as $N \to \infty$, the integral

$$\int_{-\infty}^{N} \cos\sqrt{\lambda}\, x\, d\sigma(\lambda) \tag{5}$$

converges uniformly in each finite interval $(0 \le x \le b < \infty)$ to the function $\alpha(x)$ which has an $(m+1)^{st}$ locally summable derivative. The authors find a new presentation of the solution of the inverse problem from the spectral function for the case of the classical (regular) Sturm-Liouville operator. The second section deals with the solution of the basic problem for the case of a regular Sturm-Liouville

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problem. The following formula is basic

$$a_n = \frac{\lambda_1 - \lambda}{\mu_n - \lambda_n} \prod_{k=0}{}' \frac{\lambda_k - \lambda_n}{\mu_k - \lambda_n}; \qquad (6)$$

it expresses the normalization factors of a regular Sturm-Liouville operator in terms of two of its spectra. Formula (6) gives a conditional solution of the inverse problem from two spectra. Knowing the numbers $\{\lambda_n\}$ and $\{\alpha_n\}$, they use the formula

$$\rho(\lambda) = \sum_{\lambda_n < \lambda} \frac{1}{a_n} \qquad (7)$$

to determine the spectral function and reduce the operator according to the previous prescription. Obtaining an asymptotic expansion for $\alpha_n$, they find necessary and sufficient conditions for the two sequences of real numbers $\{\lambda_n\}$ and $\{\mu_n\}$ to be two spectra of one and the same equation of the form

$$y'' + \{\lambda - q(x)\} y = 0 \quad (0 < x < \pi); \qquad (8)$$

with continuous $q(x)$ $(0 \leq x \leq \pi)$, i.e., they solve the basic problem of the article. In the third section the authors study the inverse problem for the operator

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ACCESSION NR: AP4031754

$$y'' + (\lambda^2 - q(x))\,y = 0 \qquad (0 < x < \infty), \tag{9}$$

$$y'(0) - hy(0) = 0, \tag{10}$$

where q(x) is a real locally summable function and h is a real number. At the end of this section they find an unconditional solution of the inverse problem (from two spectra) for one class of potentials. Orig. art. has: 292 formulas.

ASSOCIATION: none

SUBMITTED: 08Jul63 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: MA NO REF SOV: 029 OTHER: 006

Card 5/5

LEVITAN, B.M.

Edward Charles Titchmarsh; 1899-1963; obituary. Usp. mat. nauk 19 no.6:123-131 N-D '64 (MIRA 18:2)

ACCESSION NR: AP4015114

S/0038/64/028/001/0063/0078

AUTHOR: Levitan, B. M.

TITLE: Determination of the Sturm-Liouville differential equation from two spectra

SOURCE: AN SSSR. Izv. Ser. matem., v. 28, no. 1, 1964, 63-78

TOPIC TAGS: Sturm Liouville equation, spectrum, eigenvalue, eigenfunction, asymptotic formula, asymptotic expansion

ABSTRACT: Consider the differential equation

$$y'' + (\lambda - q(x))\, y = 0 \qquad (1)$$

with boundary conditions

$$y'(0) - hy(0) = 0, \qquad (2)$$
$$y'(\pi) + Hy(\pi) = 0. \qquad (3)$$

Here q(x) is a real continuous function, h and H are real numbers. Let $\lambda_0, \lambda_1,$

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$\lambda_2, \ldots, \lambda_n, \ldots,$ denote the eigenvalues of the problem (1),(2),(3) and let $\psi_0(x)$, $\psi_1(x), \ldots, \psi_n(x), \ldots$ denote the corresponding eigenfunctions normalized by the condition

$$\psi_n(0) = 1 \qquad (4)$$

It is well known that if q(x) is a sufficiently often differentiable function, then, starting with sufficiently large n, the following asymptotic formulas are satisfied:

$$\sqrt{\lambda_n} = n + \frac{a_0}{n} + \frac{a_1}{n^3} + \ldots, \qquad (5)$$

$$\alpha_n = \int_0^\pi \psi_n^2(x)\, dx = \frac{\pi}{2} + \frac{b_0}{n^2} + \frac{b_1}{n^4} + \ldots \qquad (6),$$

Replace (3) by

$$y'(\pi) + H_1 y(\pi) = 0, \qquad (7)$$

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ACCESSION NR: AP4015114

where $H_1 \neq H$. Denote the eigenvalues of problem (1),(2),(3) by $\mu_0, \mu_1, \mu_2, \ldots, \mu_n, \ldots$ . Since the numbers $\{\lambda_n\}$ and $\{\mu_n\}$ are alternate, none of the $\lambda_n$ may coincide with any of the $\mu_n$. The numbers $\lambda_n$ and $\mu_n$ $(n = 0,1,2,\ldots)$ uniquely determine the function $q(x)$. The author shows how, having the asymptotic expansion (5) and the analogous expansion for $\sqrt{\mu_n}$:

$$\sqrt{\mu_n} = n + \frac{a_0'}{n} + \frac{a_1'}{n^3} + \ldots, \qquad (8)$$

one can obtain the expansion of (6) and thus how to construct equation (1). His method makes it possible to compute arbitrarily many terms of the asymptotic (6). However, the determination of $b_1$ involves much computational difficulty. Therefore the author restricts himself to computing $b_0$. Let

$$\Phi_1(\lambda) = \prod_{n=0}^{\infty}\left(1 - \frac{\lambda}{\lambda_n}\right), \quad \Phi_2(\lambda) = \prod_{n=0}^{\infty}\left(1 - \frac{\lambda}{\mu_n}\right). \quad (9)$$

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ACCESSION NR: AP4015114

Since $\lambda_n = O(n^2)$, $\mu_n = O(n^2)$, the infinite products (9) converge for all $\lambda$ and are consequently entire analytic functions. It can be shown that

$$\alpha_k = A\Phi_2(\lambda_k)\,\Phi_1'(\lambda_k), \quad (10)$$

where A is some constant. Therefore the derivation of an asymptotic formula for $\alpha_k$ reduces to the study of the asymptotic behavior of $\Phi_2(\lambda_k)$ and $\Phi_1'(\lambda_k)$ for large k. The author also solves the following problem: Assume given two sequences of real numbers $\{\lambda_n\}$ and $\{\mu_n\}$ ($n = 0,1,2,\ldots$), satisfying the conditions: 1. the numbers $\{\lambda_n\}$ and $\{\mu_n\}$ alternate; 2. the asymptotic formulas (5) and (8) hold, and $a_0' \neq a_0$. The problem is to ascertain whether an equation of form (1) exists with continuous function $q(x)$, for which the numbers $\{\lambda_n\}$ and $\{\mu_n\}$ would be the two spectra. He proves the following theorem: Let the numbers $\{\lambda_n\}$ and $\{\mu_n\}$ satisfy conditions 1) and 2). Then there exists an equation of the form (1) with continuous real function $q(x)$ and real numbers h, H, and $H_1$ such that the

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ACCESSION NR: AP4015114

sequence $\{\lambda_n\}$ is the spectrum of problem (1),(2),(3), the sequence $\{\mu_n\}$ is the spectrum of problem (1),(2),(7), and

$$a_0' - a_0 = \frac{1}{\pi}(H_1 - H). \qquad (11)$$

If there are k precise terms (not counting the first) in the asymptotic expansions (5) and (8), then the function q(x) is continuously differentiable (k-2) times. In particular, for existence of an infinite classical asymptotic for the numbers $\sqrt{\lambda_n}$ and $\sqrt{\mu_n}$, it is necessary and sufficient that the function q(x) be infinitely differentiable. Two examples are given: in the first, the author gives an expression for the infinite product $\Phi_1(\lambda)$ in terms of the solution of (1); in the second he proposes a method for solving the inverse Sturm-Liouville problem. Orig. art. has: 65 formulas.

ASSOCIATION: none

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| SUBMITTED: 03Mar63 | DATE ACQ: 12Mar64 | ENCL: 00 |
| SUB CODE: MM | NO REF SOV: 004 | OTHER: 002 |

Card 5/5

GASYMOV, M.G.; LEVITAN, B.M. (Moskva)

Sturm - Louiville differential operators with discrete spectrum. (MIRA 17:4)
Mat. sbor. 63 no.3:445-458 Mr '64.

GASYMOV, M.G.; LEVITAN, B.M.

Asymptotic behavior of the spectral function of a Schrödinger operator near a plane piece of the boundary. Izv. AN SSSR. Ser. mat. 28 no.3:527-552 My-Je '64. (MIRA 17:6)

L 37076-66 EWT(d)/EWT(l) IJP(c) SOURCE CODE: UR/0020/66/167/005/0967/0970

ACC NR: AP6012910

AUTHORS: Gasymov, M. G.; Levitan, B. M.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: The inverse problem for a Dirac system

SOURCE: AN SSSR. Doklady, v. 167, no. 5, 1966, 967-970

TOPIC TAGS: Dirac system, Dirac problem, spectral function, differential equation, orthogonal transformation

ABSTRACT: The system of Dirac differential equations

$$[B\, d/dx + Q(x)]y = \lambda y, \quad 0 \leqslant x < \infty$$

is studied, where

$$B = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}, \quad Q(x) = \begin{pmatrix} p(x) & q(x) \\ q(x) & r(x) \end{pmatrix}, \quad y = \begin{pmatrix} y_1 \\ y_2 \end{pmatrix}.$$

Here it is supposed that p, q, and r are real functions which are integrable along any finite cut from $[0,\infty)$. The solution of this equation is designated by

$$\varphi(x,\lambda) = \begin{pmatrix} \varphi_1(x,\lambda) \\ \varphi_2(x,\lambda) \end{pmatrix},$$

with the initial conditions

$$\varphi_1(0,\lambda) = \sin\alpha, \quad \varphi_2(0,\lambda) = -\cos\alpha,$$

UDC: 517.948.35

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ACC NR: AP6012910

where $\alpha$ is a real number. Additional system conditions are

$$f(x) = \begin{pmatrix} f_1(x) \\ f_2(x) \end{pmatrix} \in L_2(0, \infty),$$

$$F_n(\lambda) = \int_0^n (f_1(x)\varphi_1(x, \lambda) + f_2(x)\varphi_2(x, \lambda))\, dx.$$

For each matrix Q(x) and each number $\alpha$ it can be shown that there exists a unique nondiminishing function $\rho(\lambda)$ such that

$$\int_0^\infty (f_1^2(x) + f_2^2(x))\, dx = \lim_{n\to\infty} \int_{-\infty}^{\infty} F_n^2(\lambda)\, d\rho(\lambda).$$

The authors prove the necessary and sufficient conditions for the function $\rho(\lambda)$ to be the spectral function of the given Dirac equation system. A single-valued definition of this system is sought in terms of the spectral function. The approach taken is one of reducing the system to a canonical form by which the single-valued definition can be determined through $\rho(\lambda)$. It is shown that this prototype system can be reduced to canonical form by means of an orthogonal transform. Four theorems are stated in demonstrating the veracity of the approach. This paper was presented by Academician A. A. Dorodnitsyn on 16 July 1965. Orig. art. has: 10 equations.

SUB CODE: 12/ SUBM DATE: 14Jul65/ ORIG REF: 002/ OTH REF: 003

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Card 2/2



L 43143-66 EWT(d)/EWP(1) IJP(c)

ACC NR: AP6013887 SOURCE CODE: UR/0020/66/167/006/1219/1222

AUTHOR: Gasymov, M. G.; Levitan, B. M.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Determination of the Dirac system in terms of scattering phase

SOURCE: AN SSSR. Doklady, v. 167, no. 6, 1966, 1219-1222

TOPIC TAGS: boundary value problem, continuous spectrum, equation solution, INVERSE PROBLEM

ABSTRACT: A solution is given to the inverse problem of scattering theory for the Dirac system of equations. The solution is based on a canonical form of the Dirac system of equations previously stated by the authors (DAN, 167, No. 5, 1966). The transfer operator stipulated at infinity is of fundamental importance to the solution. It is noted that the inverse problem with respect to the given scattering for the Dirac system in the case where its coefficients have the characteristic of form $\begin{pmatrix} 0 & -1/x \\ -1/x & 0 \end{pmatrix}$ at zero and infinity cannot be solved in this way. It is demonstrated that the scattering data of the problem without a characteristic are the scattering data of the problem with a characteristic of the indicated type and vice versa. The paper was presented by Academician Dorodnitsyn, A. A., 16 July 65. Orig. art. has: 21 formulas.

... 002/ OTH REF: 003

L 1:102-66 EWT(d)/EWP(1) IJP(c)

ACC NR: AP6003236 SOURCE CODE: UR/0020/65/165/006/1241/1244

24

AUTHORS: Levitan, B. M.; Sargsyan, I. S.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

B

TITLE: Continuation of solutions of a one-dimensional Dirac system

SOURCE: AN SSSR. Doklady, v. 165, no. 6, 1965, 1241-1244

TOPIC TAGS: differential equation, Cauchy problem

ABSTRACT: The authors treat

$$\left.\begin{aligned} d\varphi_2/dx + p(x)\varphi_1 &= \lambda\varphi_1, \\ -d\varphi_1/dx + q(x)\varphi_2 &= \lambda\varphi_2, \end{aligned}\right\} \quad x \geqslant 0; \qquad (1)$$

$$\varphi_1(0) = 1, \quad \varphi_2(0) = h, \qquad (2)$$

where h is an arbitrary complex number. They show how to express the solution $\varphi$ at the point -x in the form of a linear operator over $\{\varphi_1(x, \lambda), \varphi_2(x, \lambda)\}$ $(0 \leq t \leq x)$. Here p(x) and q(x) can be continued to the negative half-axis and

2

Card 1/2 UDC: 517.934

L 16102-66

ACC NR: AP6003236

$(\varphi_1(t, \lambda), \varphi_2(t, \lambda))$ is the solution of (1), (2). This paper was presented by Academician I. G. Petrovskiy on 27 April 1965. Orig. art. has: 21 formulas.

SUB CODE: 12/ SUBM DATE: 20Apr65/ ORIG REF: 001/ OTH REF: 001

Card 2/2

LEVITAN, G.

Valuable grains. NTO 3 no.8:61 Ag '61. (MIRA 14:9)
(Technological innovations)

USSR/Electronics - Pulse systems LEVITAN, G.I.

FD-1416

Card 1/1 : Pub 90-7/14

Author : Levitan, G. I., Active member of VNORiE

Title : Pulse time modulators (author's abstract)

Periodical : Radiotekhnika 9, 48-50, Sep/Oct 1954

Abstract : An examination of pulse time modulators of the "addition modulator" type using radio tubes (without cathode-ray commutation switches). They operate by the addition of the modulating signal and an auxiliary saw-tooth or sinusoidal signal, the total voltage being transmitted to the input of a pulse generator with independent excitation. Conditions close to ideal pulse time modulation of types 1 and 2 are discussed and the dynamic modulation characteristic found. Two references: USSR. (1949, 1952). Diagram.

Institution : All-Union Scientific and Technical Society of Radio Engineering and Electric Communications imeni A. S. Popov (VNORiE)

Submitted : Article on July 12, 1950; author's abstract on March 22, 1954

USSR/Electronics - Vacuum-Tube Theory FL - 1955

Card 1/1 Pub. 90, 5/9

Author : Levitan, G. I., Active Member of the Society

Title : Calculation of rectifiers with electronic stabilization

Periodical : Radiotekhnika, 10, 40-49, Feb 55

Abstract : Rectifiers with electronic stabilizers have quite an extensive field of application. A method of technical calculation of a rectifier stability limits, equipped with electronic stabilizer, at preassigned values for voltage fluctuation of power line, the load current and the control limits of stabilized potential, is presented here in considerable detail. The procedure of design calculation of stabilized rectifier is carried out in two stages; the calculation of the limits of stabilization and the calculation of the coefficient of stabilization. A modified method of calculation of stabilized rectifier with shunted control tube is also worked out.

Institution: --

Submitted : February 8, 1954

SOV-115-58-4-24/45

AUTHOR: Levitan, G.I.

TITLE: DC Amplifiers with Contact Converters (Usiliteli postoyannogo toka s kontaktnym preobrazovatelem)

PERIODICAL: Izmeritel'naya tekhnika, 1958, Nr 4, pp 54-59 (USSR)

ABSTRACT: DC amplifiers with contact conversion of the voltage being measured from dc into ac are widely used in measuring equipment. The reasons for the instability of the contact converter (vibro-converter or polarized relay type) are discussed, and the fault traced to instability in the spacing of the converted pulses, leading to errors in measurement. This can be cured by deep negative feedback and by adopting a full-wave amplitude rectification system (Figure 6a) in which the current passing through the instrument is proportional to the sum of the output voltage amplitudes and its value therefore independent of the spacing of the pulses. The value of the input impedance and problem of inertness are also discussed. The author and L.M.Ioffe, working in the Electric Geophysical Survey Laboratory at the VNII

Card 1/2

SOV-115-58-4-24/45

DC Amplifiers with Contact Converters

metodiki i tekhniki razvedki (The All-Union Research Institute for Surveying Methods and Equipment), have produced a portable dc amplifier with a sensitivity threshhold of 50 microvolts, impedance of 2.5 megohms and small inertia (Figure 11). The contact converter consists of an RP-4 polarized relay oscillating at 80 c and with an actuating capacity of 1-2 mw. The measurement range is 5mv-5v. Total gain factor is 7200 cut twice by 3.5 and 3.2 times through negative feedback. Readings on the instrument proved to be independent of pulse spacing variations within the limits of ± 30%. There are 6 circuit diagrams, 5 graphs, 1 table and 3 references, 2 of which are Soviet and 1 American.

1. Amplifiers--Design 2. Frequency converters--Design

Card 2/2

LEVITAN, G. I.

[illegible]

[illegible]

4 СЕКЦИЯ ПРИЕМНЫХ УСТРОЙСТВ

Руководитель [illegible]

[illegible]

(с 10 до 16 часов)

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

(с 18 до 22 часов)

[illegible]

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

~~[illegible]~~

[illegible]

[illegible]

5. СЕКЦИЯ ПРОВОДНОЙ СВЯЗИ

Руководитель [illegible]

9 июня

(с 10 до 16 часов)

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June, 1959

85724

S/108/60/015/006/009/012/XX
B010/B070

9.3250 (1020, 1143, 1154)

AUTHOR: Levitan, G. I., Member of the Society

TITLE: Calculation of a Diode Detector

PERIODICAL: Radiotekhnika, 1960, Vol. 15, No. 6, pp. 22-23

TEXT: Since in the calculation of the static characteristics it is usually assumed that the break of the diode characteristic lies at the zero point of the $I_a - e_a$ characteristics, these quantities are calculated in the present paper for the more practical case in which the diode characteristic is shifted to the left by the voltage $e_a = -e_{a_0}$, on account of the build-up of current (Fig. 1). With a shift of the characteristic, the operational quantities $S_d = \frac{\partial i_{a_0}}{\partial U_m}$ ($i_{a_0}$ - d.c. component in the diode, $U_m$ - peak voltage of the a.c. signal applied to the diode), $R_{i\partial} = \left(\frac{\partial i_{a_0}}{\partial u_0}\right)^{-1}$ ($u_0$ - d.c. voltage at the operational resistor $R_n$), and

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85724

Calculation of a Diode Detector

S/108/60/015/006/009/012/XX
B010/B070

$\mu_d$ are affected only by the change in the angle of current flow, as $\frac{\partial \psi}{\partial U_m}$ and $\frac{\partial \psi}{\partial u_o}$ ($\psi$ angle of current flow) are independent of $e_{a_o}$. It is known that $S_d = \frac{\sin\psi}{\pi} S$, $R_{i_\partial} = \frac{\pi}{\psi}\frac{1}{S}$, $\mu_\partial = \frac{\sin\psi}{\psi}$, where $S = \frac{di_a}{de_a}$. Therefore, it is necessary only to calculate the change of $\psi$ due to the shift in the characteristic. For this purpose, the two fundamental equations $i_{a_o} = \frac{SU_m}{\pi}(\sin\psi - \psi\cos\psi)$ and $\cos\psi = \frac{u_o - e_{a_0}}{U_m}$ are combined to give the following relation between $\psi$ and the shift of the characteristic: $\frac{a}{\pi}\sin\psi - (1 + \frac{a}{\pi}\psi)\cos\psi = b$, where $a = SR_N$ and $b = \frac{e_{a_2}}{U_m}$. The function $\psi = \psi(a, b)$ is represented in Fig. 2. For small angles of current flow, sin and cos may be approximated by the first two terms of their expansion in Taylor series when the following explicit formula is obtained: $\psi = \sqrt[3]{\frac{3\pi}{a}(1 + b)}$. The operational transmission factor K is given by

Card 2/4

85724

Calculation of a Diode Detector

S/108/60/015/006/009/012/XX
B010/B070

$K = \frac{\mu_d R_N}{R_{i\partial} + R_N} = \frac{\sin\psi}{\pi/SR_N + \psi}$. If the values of the angle of current flow are taken from Fig. 2 and substituted in the expressions for $S_d$, $R_{i\partial}$, $\mu_d$, and K, it is seen that the shift of the characteristic affects practically only $S_d$ and $R_{i\partial}$. There are 2 figures and 1 Soviet reference..

SUBMITTED: December 22, 1958

Card 3/4

85724

S/108/60/015/006/009/012/XX
B010/B070

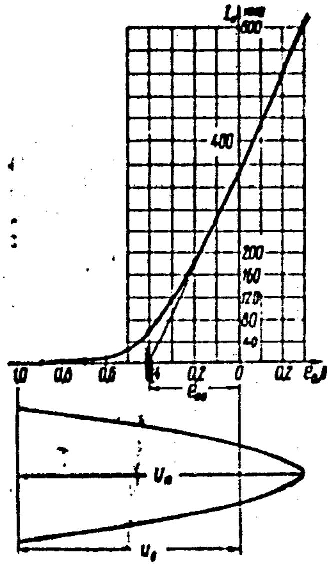

Рис. 1 Fig. 1

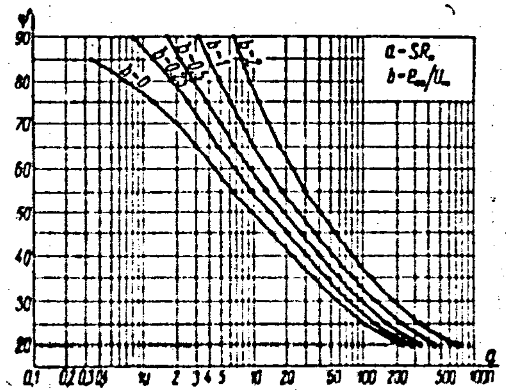

Рис. 2 Fig. 2

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24077
S/106/61/000/002/006/006
A055/A133

9,2550

AUTHORS: Levitan, G. I. and Vostryakov, O. I.

TITLE: Synthesis of polynomial band-pass filters with the Chebyshev characteristic of selectivity

PERIODICAL: Elektrosvyaz', no. 2, 1961, 60 - 69

TEXT: In the calculation of iterative band-pass filters, the method evolved by V. Kauer and S. Darlington is generally resorted to. This method was namely used by M. Dishal [ Ref. 2: Dishal. "Design of dissipative band-pass filters producing desired exact amplitude-frequency characteristics." PIRE, 37. September 1949]. The author of the present article begins by reproducing the essential part of Dishal's theoretical calculations. Then, using these calculations and some fundamental equations of the Chebyshev's filter synthesis, he deduces a set of formulae giving the attenuation and the coupling coefficients in the cases of a three-circuit and of a four-circuit filter respectively. For each of these filter-types he analyses the cases of symmetrical and asymmetrical distribution of attenuation and coupling. His conclusion is that filters with a symmetrical distribution are more advantageous for band control. He then examines briefly the cases of a five-circuit and of a six-circuit filter. The

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24077

S/106/61/000/002/006/006
A055/A133

Synthesis of polynomical band-pass filters ...

correctness of the formulae obtained by him was checked experimentally. The general conclusion is that these formulae allow to calculate, with sufficient precision, wide-band filters, as well as filters with loss-compensation in certain circuits. There are 11 figures and 10 references: 6 Soviet-bloc, 4 non-Soviet-bloc. The three references to English-language publications read as follows: Lepage, Seely. General network analysis. Ch. VII Mc, Graw-Hill Co. 1952 Dishal. "D sign of dissipative band-pass filters producing desired exact amplitude-frequency characteristics;" Dishal. "Exact design and analysis of double- and triple - tuned band-pass amplifiers". PIRE, June 1947.

SUBMITTED: August 29, 1960.

Card 2/2

S/106/62/000/005/002/007
A055/A101

9,2550

AUTHORS: Levitan, G.I.; Bel'dyugin, V.N.; Vostryakov, O.I.

TITLE: Control of the passband in narrow-band filters

PERIODICAL: Elektrosvyaz', no. 5, 1962, 12 - 23

TEXT: The object of this article is to examine the possibilities of controlling the passband of polynomial filters and of filters with attenuation peaks, or, rather, to examine them more thoroughly than this has been done until now. It is assumed that the control of the band must not change the shape of the selectivity characteristic. After an analysis of the conditions to be satisfied in polynomial filters of various types (k, m, VI and VI' types), the authors deal with the electrical control of the passband, such as it was first worked out in the Odessa Communication Institute in 1958 - 1959 and permitting to achieve an automatic or a remote control ( and also to reduce the size and to simplify the construction of radio-apparatuses). To realize this control, it is possible to use ferrovariometers, controlled capacitors and also some electronic systems transforming the wave-impedance of the circuits. Point-contact diodes

Card 1/2

S/106/62/000/005/002/007
A055/A101

Control of the passband in narrow-band filters

or nonlinear resistances can be used for controlling the attenuation of the circuits. The authors examine first the control of the coupling between circuits, this control being effected by varying the resistance of the coupling; three systems permitting this control are described. The authors next examine the transformation of the wave-impedance of resonance circuits. In the last chapter of the article, they examine the control of the passband of filters with attenuation peaks. Most of the circuits described in the article are new, according to the authors. The article is purely analytical. The Soviet personalities mentioned in the article are: Yu.F. Korobov, P.K. Akul'shin, I.A. Koshcheyev, K.E. Kul'batskiy, N.I. Chistyakov, V.M. Sidorov and V.S. Mel'nikov. There are 24 figures and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc.

SUBMITTED: October 3, 1961

Card 2/2

LEVITAN, G.I.; BEL'DYUGIN, V.N.; VOSTRYAKOV, O.I.

Regulation of the pass band of a narrow-band filter. Elektrosviaz' 16 no.5:12-23 My '62. (MIRA 15:5)
(Electric filters)

ACCESSION NR: AP4026138 S/0106/64/000/003/0005/0016

AUTHOR: Levitan, G. I.; Peysikhman, A. L.

TITLE: Signal-to-noise ratio monitor

SOURCE: Elektrosvyaz', no. 3, 1964, 5-16

TOPIC TAGS: signal, signal noise ratio, signal noise ratio monitor, frequency manipulated signal, noise isolation

ABSTRACT: Two systems of a signal-to-noise ratio monitor are considered (see Enclosure 1): (1) amplitude limiter plus frequency discriminator type and (2) AGC plus amplitude detector type. Both were developed in 1960-61 for frequency-keyed signal reception. Theoretical relations for the square spectral density of noise at the output of frequency and amplitude detectors are established. Higher components of keying frequency pass through the band filter along with the noise that produces information in the monitor; these components

Card 1/3

ACCESSION NR: AP4026138

are called "residue." The effects of the residue and its contribution to the monitor error are discussed as is the connection between the inertia of the monitor and that of the information channel. Some hints for designing the ratio monitor are offered. Experimental verification of both systems of the monitor was made by connecting them to the 215-kc IF channel of a short-wave receiver. The latter's internal noise was regarded as a noise source. Tabulated data of the maximum signal-to-noise ratio permits a rough evaluation of the effects of the passband, frequency deviation, h-f filter cutoff frequency, and ondulation of the IF-amplifier band filter. Orig. art. has: 13 figures, 18 formulas, and 3 tables.

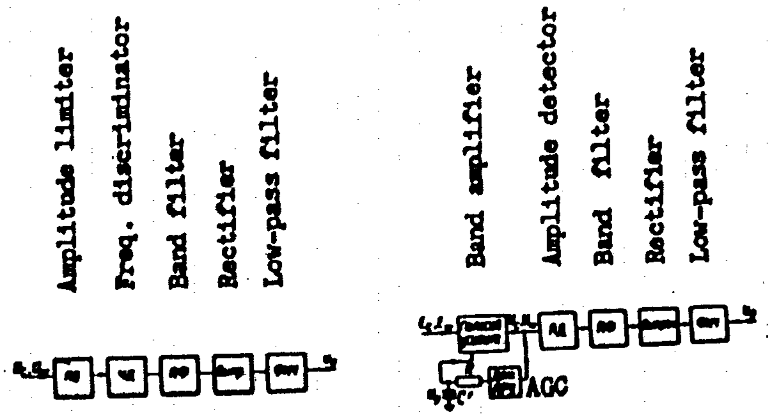
ASSOCIATION: Odesskiy institut svyazi (Odessa Institute of Communications)

SUBMITTED: 19Mar63 DATE ACQ: 17Apr64 ENCL: 01

SUB CODE: EC NO REF SOV: 002 OTHER: 004

Card 2/3

ACCESSION NR: AP4026138 ENCLOSURE: 01




Amplitude limiter plus frequency discriminator type

AGC plus amplitude detector type

Signal-to-noise ratio monitor

Card 3/3

ACCESSION NR: AP4033365 S/0103/64/025/003/0424/0427

AUTHOR: Levitan, G. I. (Khar'kov)

TITLE: Five-stage shift register designed with static triggers intended for decimal counting

SOURCE: Avtomatika i telemekhanika, v. 25, no. 3, 1964, 424-427

TOPIC TAGS: register, shift register, computer, computer register, semiconductor shift register, five stage shift register

ABSTRACT: At higher speeds of operation, the decimal-counting 8-4-2-1-code schemes become very complicated and involve too many elements. The article proposes a decimal-counting scheme based on a shift register containing five semiconductor triggers and provided with a logical feedback. The sequence table is shown in Enclosure 01. The frequency limit of the decade is determined by the time of flipping of one trigger only. An experimental counter designed with P16



APPROVED FOR RELEASE: 07/12/2001 CIA-RDP86-00513R000929620010-2"

ACCESSION NR: AP4033365

transistors, D9D diodes, and VT-5 ferrites reliably operated at an input-pulse frequency of 100 kc. Orig. art. has: 3 figures and 2 formulas.

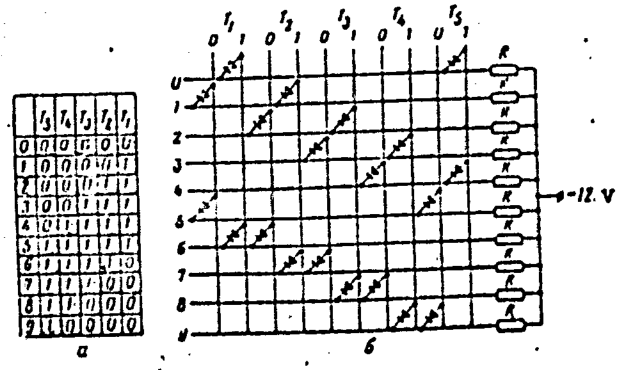
ASSOCIATION: none

SUBMITTED: 08Oct62 DATE ACQ: 15May64 ENCL: 01

SUB CODE: DP NO REF SOV: 003 OTHER: 001

ENCLOSURE: 01

ACCESSION NR: AP4033365



A sequence table showing that each decimal digit is determined by the state of 2 triggers

Card 3/3

LEVITAN, G.I. (Khar'kov)

Five-stage shift register using static triggers as a decimal scaling circuit. Avtom. i telem. 25 no.3:432-435 Mr '64. (MIRA 17:6)

L 45217-66 EWT(1)
ACC NR: AR6026478 SOURCE CODE: UR/0274/66/000/004/A010/A010

5B

AUTHOR: Levitan, G. I.

ORG: none

25

TITLE: Noise spectrum at the output of linear amplitude and frequency detectors

SOURCE: Ref. zh. Radiotekhnika i elektrosvyaz', Abs. 4A61

REF SOURCE: Tr. uchebn. in-tov svyazi. M-vo svyazi SSSR, vyp. 26, 1965, 53-60

TOPIC TAGS: noise spectrum, amplitude detector, frequency detector

ABSTRACT: Approximate expression are derived for noise spectra at the outputs of linear amplitude and frequency detectors whose inputs are fed strong sinusoidal signals. Two cases have been investigated: 1) the sinusoidal signal is located on the edge of receiver passband; 2) the signal is frequency keyed. Noise is represented in the form of a sum of harmonic oscillations with random phases. Signal-noise and noise-noise-type components are taken into account. [DW]

SUB CODE: 09/

Card 1/1 hs

LEVITIN, I.

Using the AP-ID automatic packaging machine at the Chelyabinsk Groat Mill. Muk.-elev. prom. 27 no.4:20 Ap '61. (MIRA 14:7)

1. Glavnyy inzhener Chelyabinskogo krupozavoda No.11.
(Packaging machinery)

15.9130

S/138/59/000/07/08/009

82266

AUTHORS: Fel'dshteyn, M.S., Eytingon, I. I., Levitin, I. A., Shapiro, A. L., Sokolova, L. M.

TITLE: On the Application of Diethylaminomethyl-2-Thiobenzothiazole (BTMA) as an Accelerator of Tire Rubber Vulcanization

PERIODICAL: Kauchuk i Rezina, 1959, No. 7, pp. 40-47

TEXT: The authors refer to aminomethyl derivatives of 2-mercaptobenzothiazole as being effective vulcanization accelerators of mixtures of natural and synthetic butadiene-styrene rubber. This subject was given detailed consideration in Ref. 1-3. It is stressed by the authors of this article that diethylaminomethyl-2-thiobenzothiazole, a respresentative of the group under discussion, being close in its properties to the accelerator, used at present in industry, sulfenamide BT, differs from it, however, by ensuring a higher rate of vulcanization of the rubber mixtures at the initial stage. Besides, the sulfenamide BT accelerator is difficult to store. The authors also point out that the BTMA accelerator does not have many of the shortcomings which the latter accelerator does. They list the physical and chemical properties of BTMA and specify how it can be obtained in the laboratory. In order to utilize BTMA in industry, for tire manufacturing,

Card 1/2

S/138/59/000/07/08/009

On the Application of Diethylaminomethyl-2-Thiobenzothiazole (BTMA) as an Accelerator of Tire Rubber Vulcanization 82266

wide-scale tests were conducted in the plants. It was shown that the introduction of BTMA accelerator into the protective mixtures of butadiene-styrene rubber (SKS-30 AM), instead of sulfenamide BT, and also into the mixture of butadiene-styrene and natural rubber (at the ratio 70:30), containing various types of carbon black, has very little effect on the plastic-elastic properties of these mixtures and leads to the production of vulcanizates equal to those with sulfenamide BT in their physico-mechanical properties. An experimental batch of tires was produced using the BTMA accelerator in the protective mixture. The technical properties of this protective rubber, according to static and dynamic test data, and according to the durability of the tire casings under stand rolling tests, are actually equal to those of the serial rubber, containing the BT accelerator. As a result of the obtained information, the authors recommend that wide-scale tests be carried out on the BTMA accelerator in protective rubbers instead of on the rubber with the BT accelerator, in several tire-manufacturing plants. There are 9 sets of graphs, 4 tables, 4 Soviet references.

ASSOCIATION: Moskovskiy shinnyy zavod i Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (The Moscow Tire-Manufacturing Plant and the Scientific Research Institute of the Tire Industry)

Card 2/2

LEVITAN, I.I.; KIL'MATOV, R.F.

Organizing high prodoction work in asphalt concrete plants. Avt.dor. 18 no.4:4-6 Jl-Ag'55. (MLRA 8:11)

(Asphalt concrete)

L 41725-66 EWT(1)/EWT(m)/T/EWT(t)/ETI IJP(c) JD/JG

ACC NR: AP6020201 SOURCE CODE: UR/0056/66/050/006/1478/1480

59
57
B

AUTHOR: Levitin, R. Z.; Ponomarev, B. K.

ORG: Moscow State University (Moskovskiy gosudarstvennyy universitet)

TITLE: Magnetostriction of a metamagnetic iron-rhodium alloy

SOURCE: Zh eksp i teor fiz, v. 50, no. 6, 1966, 1478-1480

TOPIC TAGS: iron alloy, rhodium alloy, magnetostriction, ferromagnetic material, antiferromagnetic material, critical point, critical magnetic field

ABSTRACT: This is a continuation of earlier work (ZhETF v. 46, 2003, 1964) on various properties of iron-rhodium alloys, which have been shown to be antiferromagnetic below a certain critical temperature and ferromagnetic above it. Since these results imply that such an alloy (close in composition to $Fe_{0.5}Rh_{0.5}$) should have a very large magnetostriction, especially below the critical temperature and at fields stronger than the critical field, the authors have measured the magnetostriction at temperatures 290 - 400K and in fields up to 150 kOe. The magnetostriction was measured in pulsed magnetic fields with apparatus described elsewhere (PTE, No. 3, 188, 1966). The measurement procedure was modified somewhat to permit direct photography of the field dependence of the magnetostriction from the oscilloscope screen. The results confirm that below the critical temperature (~360K) the magnetostriction increases rapidly when the critical field (which varies with the temperature) is reached. If, conversely, the values of the critical fields are determined from the maximum slope of the magnetostriction curves, the results agree within the limit of errors

Card 1/2

L 41735-66
ACC NR: AP6020201

2

with the critical fields obtained in the earlier investigation from the magnetization curves. The magnetostriction reaches a value ($3 - 3.6 \times 10^{-3}$) and decreases rapidly in the ferromagnetic region (above the critical temperature). The magnetostriction is thus shown to be connected essentially with the transition from the antiferromagnetic into the ferromagnetic state under the influence of the field. The magnetostriction exhibits a noticeable hysteresis at low temperatures. This confirms that the transition is a first-order one. The authors thank Professor K. P. Belov for interest in the work. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 17Jan66/ ORIG REF: 003/ OTH REF: 006

Card 2/2

VOL'KENSHTEYN, M.V.; LEVITAN, I.O.

Optical activity and conformation of some alicyclic ketones. Zhur. strukt.khim. 3 no.1:80-86 Ja-F '62. (MIRA 15:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR i Leningradskoy gosudarstvennyy pedagogicheskiy institut imeni A.I.Gertsena.

(Ketones--Optical properties)

VOL'KENSHTEYN, M.V.; LEVITAN, I.O.

Optical activity and conformation of some alicyclic terpenes. Zhur. strukt.khim. 3 no.1:87-92 Ja-F '62. (MIRA 15:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR i Leningradskiy gosudarstvennyy pedagogicheskiy institut imeni A.I.Gertsena.

(Terpenes—Optical properties)

LEVITAN, KH. N.

33495. K. Voprosu Ob Ostrom Diffuznom Glomerulonefrite. Trudy Kurskogo Gos. Med. In-ta, T. 11, Vyp. 2, 1948, c. 51-55

SO: Letopis'nykh Statey, Vol. 45, Moskva, 1949

LEVITAN, KH. N.

33496. Lecheniye Yazennoy Bolezni Biozhinolem. Trudy Kurskogo Gos. Med. in-ta, t. 11, Vyp. 2, 1948, c. 91-95

SO: Letopis'nykh Statey, Vol. 45, Moskva, 1949

LEVITAN, Kh.N., prof.; SHUMAKOV, I.A.; ZIMIN, A.A.

Testing the absorption of radioiodine by the thyroid gland in nephritis. Sbor. trud. Kursk. gos. med. inst. no.16:225-229 '62. (MIRA 17:9)

1. Iz fakul'tetskoy terapevticheskoy kliniki (zav. - prof. Kh.N. Levitan) Kurskogo meditsinskogo instituta.