On First Order Differential Equations in the Hilbert Space With a Variable Positive-Definite Selfadjoint Operator, the Fraction Power of Which has a Constant Region of Definition SOV/20-123-6-8/50

$$\left\| A^{1/2}(t)A^{-1/2}(\tau)-A^{-1/2}(t)A^{1/2}(\tau)\right\| \leq C(p)\left\{ \max_{x,i,k} \left| a_{ik}(t,x) - a_{ik}(\tau,x)\right| + \max_{x} a(t,x)-a(\tau,x)\right| + \left[\int_{\Gamma} \left|\sigma(t,x)-\sigma(\tau,x)\right|^{p} dl\right]^{1/p}\right\}.$$

There are 16 references, 13 of which are Soviet, 1 American, 1 German, and 1 Japanese.

ASSOCIATION: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: August 1, 1958, by I.G.Petrovskiy, Academician

SUBMITTED: July 24, 1958

Card 3/3

S/044/62/000/003/061/092
C111/C444

16 3400

AUTHOR: Sobolevskiy, P. Ye.

TITLE: On an approximative method for the solution of differential equations

PERIODICAL: Referativnyy zhurnal, Matematika, no. 3, 1962, 36, abstract 3V185. ("Zap. Voronezhsk. s.-kh. in-ta", 1959, 28, no. 2, 399-400)

TEXT: Considered is the problem

$$\frac{dx}{dt} + Ax = 0, \quad x\big|_{t=0} = x^0, \qquad (1)$$

where $x = x(t)$, $t \geqslant 0$, is a function with values in the Banach space E, A being a closed linear operator in E with a dense domain (D(A).
Let $\{A_n\}$ be a sequence of bounded operators in E such that for $x \in D(A)$ $\lim\limits_{n \to \infty} \| A_n x - Ax \| = 0$, and let $\{x_n^0\}$ be a sequence of elements of the space E $x_n^0 \to x^0$. Let $x_n(t)$ be the solution of the problem

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$$\frac{dx}{dt} + A_n x = 0, \quad x\Big|_{t=0} = x_n^0 \quad .$$

Two theorems, granting the convergence of $x_n(t)$ to the solution of problem (1), are formulated without proof.

[Abstracter's note: Complete translation.]

16(1) SOV/20-128-1-10/58

AUTHOR: Sobolevskiy, P.Ye.

TITLE: Non-Stationary Equations of Viscous Fluid Dynamics

PERIODICAL: Doklady Akademii nauk SSSR, Vol 128, Nr 1, pp 45-48 (USSR), 1959

ABSTRACT: Let Ω be an open domain of the m-dimensional space with the boundary Γ ; U_0 a vector function defined on $\Omega + \Gamma$. The author considers the problem

$$(2) \quad U_t' + \nu AU + P_{u_k} U_{x_k}' = Pf(t) \quad , \quad U(0) = U_0 \quad ,$$

where P is the operator of the orthogonal projection in the $L_2(\Omega)$ on the subspace H, H closure of the set of smooth solenoidal vectors vanishing on the boundary ; A the Friedrichs self-adjoint extension in H of the operator P_Δ originally defined on $H \cap \overset{o}{W}{}_2^2$.

The investigation of (2) is carried out by transition to the integral equation

Card 1/3

$$(3)\quad U(t) = \exp\left\{-t\nu A\right\}U_o - \int_0^t \exp\left\{-(t-s)\nu A\right\} P_{u_k} U'_{x_k}\, ds + \int_0^t \exp\left\{-(t-s)\nu A\right\} Pf(s)ds\ .$$

Let $0 < \alpha < m/2$, $U_o \in D(A^{1/2})$, $\|f(t)\|^2$ be integrable on $[0,T]$. Let $n = 2$ for $m = 3$ and $n \geqslant 2$ for $m = 2$.

Theorem 1 : There exists a unique solution of

$$(9)\quad (A^{-\alpha}U)'_t + A^{1-\alpha}U + A^{-\alpha}P_{u_k}U'_{x_k} = A^{-\alpha}Pf(t)\ ,\quad U(0) = U_o$$

defined on $[0,t_o]$. The function $A^{1/2}U(t)$ is continuous and $A^{-\alpha}U(t)$ is absolutely continuous in H. Furthermore : $\|(A^{-\alpha}U)'_t\|$, $\|A^{1-\alpha}U\|^2$ is integrable according to Lebesgues.

The identity

Non-Stationary Equations of Viscous Fluid Dynamics SOV/20-128-1-10/58

$$\left(\int_{\Omega} UVdx\right)'_t + \nu\int_{\Omega} U'_{x_k} V'_{x_k} dx + \int_{\Omega} u_k U'_{x_k} Vdx = \int_{\Omega} fVdx$$

holds for all $V \in H \cap \overset{o1}{W}_2$.

Theorem 2 : For m = 2 there exists the solution of (9) for $t \geq 0$.

Theorem 3 states the correctness of the problem.

Theorem 4 considers the stability of the solutions of (2) for $t \to \infty$ in the case m = 2 .

M.A. Krasnosel'skiy, S.G. Kreyn, and S.L. Sobolev are mentioned. There are 13 references, 10 of which are Soviet, 2 German, and 1 French.

Association: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: May 14,1959, by A.N. Kolmogorov, Academician

SUBMITTED: May 13,1959

Card 3/3

66442

16(1) 16.4600 SOV/20-129-3-7/70

AUTHORS: Krasnosel'skiy, M.A., and Sobolevskiy, P.Ye.

TITLE: Fractional Powers of Operators Acting in Banach Spaces

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 3, pp 499-502 (USSR)

ABSTRACT: An operator A in the complex Banach space E is called normally positive if D(A) is dense in E and if for all $t \geqslant 0$ there exist the bounded operators $(A+tI)^{-1}$ defined in the whole E, where

(1) $\|(A+tI)^{-1}\| \leqslant \frac{C}{1+t} \qquad (t \geqslant 0).$

Let the operators $A^{-\alpha}$ $(\alpha \geqslant 0)$ be defined by $A^0 = I$ and

(2) $A^{-\alpha} = \frac{\sin \pi\alpha}{\alpha} \cdot \frac{n!}{(1-\alpha)(2-\alpha)\ldots(n-\alpha)} \int_0^\infty t^{n-\alpha}(A+tI)^{-n-1}\, dt,$

where $n > \alpha - 1$.

Theorem 1: Let A be normally positive. Then the $A^{-\alpha}$ form a strongly continuous semigroup of bounded operators.

Theorem 2: From $A^{-\alpha}x = 0$ for $\alpha \geqslant 0$ there follows $x = 0$. The sets of

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Fractional Powers of Operators Acting in Banach Spaces SOV/20-129-3-7/70

values $R(A^{-\alpha})$ of the $A^{-\alpha}$ are dense in E. For $\alpha > \beta \geq 0$ it holds $R(A^{-\alpha}) \subset R(A^{-\beta})$.

Theorem 3: Let $0 < \alpha < \beta$. Let A_1 be defined on $D(A^{\beta})$ by $A_1 x = A^{\alpha} x$. Then A^{α} is the closure of A_1.

Theorem 4: Let A be normally positive. Let $|\alpha| \leq |\beta|$, let α and β have the same sign. Then

$$(6) \qquad \|A^{\alpha}x\| \leqslant K(\alpha, \beta) \|A^{\beta}x\|^{\alpha/\beta} \|x\|^{1-\alpha/\beta} \qquad (x \in D(A^{\beta})),$$

where K depends only on α, β and C of (1).

Three further theorems treat the comparison of several fractional operators. The authors mention M.Z.Solomyak, and S.G.Kreyn. There are 14 references, 13 of which are Soviet, and 1 German.

PRESENTED: July 9, 1959, by S.L.Sobolev, Academician

SUBMITTED: July 8, 1959

Card 2/2

32453
S/044/61/000/010/017/051
C111/C222

16.3500

AUTHOR: Sobolevskiy, P.Ye.

TITLE: Parabolic equations with variable boundary conditions

PERIODICAL: Referativnyy zhurnal. Matematika, no. 10, 1961, 43-44, abstract 10 B 192. ("Tr. Vses. soveshchaniya po differentsial'n. uravneniyam, 1958", Yerevan, AN Arm SSR, 1960, 165-166)

TEXT: The author gives the following theorems without proof :

Theorem 1: Let $A(t)$ $(0 \leq t \leq 1)$ be a positive definite self-adjoint operator in the Hilbert space H. For a certain $0 < \varrho < 1$ let the region of definition of the operator $A^{\varrho}(t)$ do not depend on t, and let the bounded operator $A^{\varrho}(t)A^{-\varrho}(0)$ satisfy the condition Lip $(1-\varrho+\varepsilon)$

$$\| A^{\varrho}(t) A^{-\varrho}(0) - A^{(\varrho)}(\tau)A^{-\varrho}(0)\| \leq K|t - \tau|^{1-\varrho+\varepsilon}$$

Then there exists an operator being defined and strongly continuous in t and τ for $0 \leq \tau \leq t \leq 1$. For $t > \tau$ this operator is continuous in t and τ in the sense of the operator norm, it is one time continuously

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differentiable with respect to t as well as to τ, it satisfies the equations

$$\frac{\partial u(t,\tau)}{\partial t} + A(t)u(t,\tau) = 0, \quad \frac{\partial u(t,\tau)}{\partial \tau} - \overline{U(t,\tau)A(\tau)} = 0$$

and the initial condition

$$u(t,t) = I.$$

For arbitrary $0 \leq \alpha \leq \varsigma$, $0 \leq \gamma < 1 + \varepsilon$, $\alpha \leq \gamma$ there hold the inequalities

$$\| A^{\gamma}(t)u(t,\tau)A^{-\alpha}(\tau)\| \leq \frac{K(\gamma,\alpha)}{|t-\tau|^{\gamma-\alpha}}$$

$$\| A^{-\alpha}(t)u(t,\tau)A^{\gamma}(\tau)\| \leq \frac{K(\gamma,\alpha)}{|t-\tau|^{\gamma-\alpha}}.$$

Theorem 2 : Let $x \in G$, $0 < t \leq 1$, G -- region of the m-dimensional space $x = (x_1, \ldots, x_m)$ with the boundary Γ. In order that there exists a

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Parabolic equations with variable ...

unique solution $v(t,x)$ of the equation

$$\frac{\partial v}{\partial t} - \sum_{i,k=1}^{m} \frac{\partial}{\partial x_i}\left[a_{ik}(t,x)\ \frac{\partial v}{\partial x_k}\right] + a(t,x)v = 0$$

satisfying the initial condition

$$v(0,x) = v_o(x)$$

and the boundary condition

$$\sum_{i,n=1}^{m} a_{ik}(t,x)\ \frac{\partial v}{\partial x_k} \cos\ (n,x_i) + \sigma(t,x)v\Big|_{\Gamma} = 0$$

it is sufficient that for arbitrary $0 \leq \tau$, $t \geq 1$ and a certain $\epsilon > 0$ the inequality

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AUTHOR: Sobolevskiy, P.Ye. SOV/20-130-2-8/69

TITLE: The Use of Fractional Powers of Self-adjoint Operators in the Investigation of Some Non-linear Differential Equations in Hilbert Space

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 272 - 275 (USSR)

ABSTRACT: The author investigates the non-linear problem

$$(1) \qquad v' + A(t,v) = 0 \qquad (0 \le t \le T) \quad ; \quad v(0) = v_0$$

in the Hilbert space H. Certain functions $y = y(t)$ with values in H are introduced so that a solution $U(t,0;y)$ of the linear problem $z' + A(t,y)z = 0$ $(0 \le t \le T)$, $z(0) = v_0$ corresponds to them. The existence problem for (1) is thus reduced to the question whether the operator $Uy = U(t,0;y)v_0$ possesses a fixed point. At first the author considers the linear problem, where he essentially generalizes his former result [Ref 7]

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The Use of Fractional Powers of Self-adjoint Operators in the Investigation of Some Non-linear Differential Equations in Hilbert Space SOV/20-130-2-8/69

concerning the existence of the solution in the homogeneous case. Then he investigates (1) with an abstract operator. The general results are applied to parabolic equations with an elliptic operator of second order and with non-linear boundary conditions. The details are based on the use of fractional operator powers.
The author thanks M.A. Krasnosel'skiy for the subject.
There are 9 Soviet references.

ASSOCIATION: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: September [illegible], by A.N. Kolmogorov, Academician
SUBMITTED: September 17, 1959

Card 2/2

69498

S/020/60/131/04/12/073

16.7600

AUTHOR: Sobolevskiy, P.Ye.

TITLE: The Smoothness of Generalized Solutions to Navier-Stokes Equations

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol.131, No.4, pp.758-760.

TEXT: The author considers the linearized stationary hydrodynamic problem

(1) $-\Delta\vec{U}(x) = \text{grad } p(x)+\vec{f}(x)$, $\text{div } \vec{U}(x) = 0$ for $x \in \Omega$;

$\vec{U}(x) = 0$ for $x \in \Gamma$,

where Ω is a bounded open domain with a sufficiently smooth boundary Γ. Let $p_1(x) = p(x)$ on Γ and $\Delta p_1 = 0$ in Ω.

Theorem 1: If $\vec{f}$ is continuously differentiable, then

(3) $p = -\Delta^{-1} \text{ div } \vec{f} + p_1$.

Theorem 2: Let $\vec{f} \in L_q(\Omega)$, $q > 2$. Then

(2) $u_i(x) = \int_\Omega G_{ij}(x,z)f_j(z)dz$, $p(x) = \int_\Omega g_j(x,z)f_j(z)dz$

is a generalized solution of (1); the equations are satisfied almost every-

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The Smoothness of Generalized Solutions to Navier-Stokes Equations S/020/60/131/04/12/073

where; $\vec{U} \in \overset{o}{W}{}_2^2(\Omega)$, $p \in W_2^1(\Omega)$; it holds

(4) $\|\text{grad } p\|_{L_2(\Omega)} \leqslant C(q) \|\vec{f}\|_{L_q(\Omega)}$

(5) $\|\vec{U}\|_{W_2^2(\Omega)} \leqslant C_1(q) \|\vec{f}\|_{L_q(\Omega)}$.

If $q > 3$, then p and $\frac{\partial \vec{U}}{\partial x_i}$ are continuous in $\overline{\Omega}$.

Then the author considers the nonlinear instationary problem

$$\frac{\partial \vec{U}}{\partial t} - \nu \Delta \vec{U} + u_k \frac{\partial \vec{U}}{\partial x_k} = \text{grad } p + \vec{f},$$

(6) $\text{div } \vec{U} = 0$ for $x \in \Omega$, $t > 0$;

$\vec{U}(t,x) = 0$ for $x \in \Gamma$, $t \geqslant 0$;

$\vec{U}(0,x) = \vec{U}_0(x)$ for $x \in \overline{\Omega}$.

The author proves the existence of a solution under weaker assuptions on $\vec{U}_0$ than in (Ref.4). The author investigates how for $t > 0$ the smoothness of $\vec{f}$

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increases.
Theorem 3: Let $\vec{f}(t,x)$ in all variables satisfy the condition Lip γ with $\gamma > 3/4$. Then $\vec{U}$ and p (for $t > 0$) are the classical solutions of (6). The form of the solutions of (6) was considered by the author in (Ref.6). The author mentions M.A.Krasnosel'skiy, V.P.Glushko and S.G.Kreyn. There are 8 references: 7 Soviet and 1 German.

ASSOCIATION: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: December 9, 1959, by P.S.Aleksandrov, Academician

SUBMITTED: December 9, 1959

Card 3/3

SOBOLEVSKIY, P. Ye.

Doc Phys-Math Sci - (diss) "Theory of fractional degrees of operators in Banach space, and its application in studying equations of the parabolic type." Moscow, 1961. 20 pp; (Ministry of Higher Education USSR, Moscow State Univ); 200 copies; price not given; bibliography on pp 19-20 (23 entries); (KL, 10-61 sup, 203)

SOBOLEVSKIY, P.Ye.

Stabilization of solutions of nonlinear parabolic equations. Uch. zap. AGU. Ser. fiz.-mat. i khim. nauk no.2:17-23 '61. (MIRA 16:7)

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16.3400

S/044/62/000/002/052/092
C111/C444

AUTHOR: Sobolevskiy, P. Ye.

TITLE: On equations of parabolic type in a Banach space

PERIODICAL: Referativnyy zhurnal, Matematika, no. 2, 1962, 109, abstract 2B481. ("Tr. Mosk. matem. o-va", 1961, 10, 297-350)

TEXT: In the Banach space E one investigates the ordinary differential equations with the initial condition $v|_{t=0} = v_0$:

a linear homogeneous differential equation:

$$\frac{\partial v}{\partial t} + A(t)v = 0 \qquad (1)$$

a linear inhomogeneous equation:

$$\frac{\partial v}{\partial t} + A(t)v = f(t) \qquad (2)$$

a non-linear equation:

$$\frac{\partial v}{\partial t} + A(t, v)v = f(t, v) \qquad (3)$$

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On equations of parabolic type . . .

In § 2 one investigates the equations (2) and (3) by aid of the results of § 1. The formal solution of (2) may be written down in the following form:

$$v(t) = U(t, 0)\, v_0 + \int_0^t U(t, s)\, f(s)\, ds \qquad (5)$$

in the case of the equation (3) an analogous formula leads to a non-linear integral equation for the searched solution. It is proved that in case of f(s) satisfying the condition Lip ϱ, (5) defines a function which is strongly continuously differentiable for $t > 0$, satisfying (2). Adjoining the properties of v(t) are carefully investigated under different suppositions on f(s). Especially v(t) proves to be analytic under certain suppositions. With respect to the equation (3) one obtains the following result:

Theorem 7: Let $A_0 = A(0, v_0)$ be a linear operator with its domain D being dense in E. A_0 is assumed to satisfy (4) and its inverse operator to be compact. For an $\alpha \in [0,1)$ and all v from $\| v \| \leq R$ the operator

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$A(t, A_o^{-\alpha} v)$ be defined on D, the functions $A(t, A_o^{-\alpha} v) A_o^{-1}$ and $f(t, A_o^{-\alpha} v)$ are to satisfy on this sphere the condition Lip ε with respect to t and Lip ς with respect to v. At least let $v_o \in D(A_o^{\beta})$ for a $\beta > \alpha$ and $\| A_o^{\alpha} v_o \| < R$. Then there exists in a certain interval $[0, t_o]$ at least one solution of (3) being continuous for $t \in [0, t_o]$, and being continuously differentiable for $t > 0$, satisfying the initial condition $v|_{t=0} = v_o$. If $\varsigma = 1$, then there exists such a solution even without the supposition of the compactness of A_o^{-1}; then this solution is unique and can be obtained by successive approximation.

In § 3 the obtained results are applied to the investigation of linear and quasilinear parabolic equations. For the latter one proves a local theorem of existence (without any restrictions on the growth of the coefficients).

[Abstracter's note: Complete translation.]

SOBOLEVSKIY, P.Ye. [Sobolievs'kyi, P.O.]

A method of proving nonlocal existance theorems for parabolic equations. Dop. AN URSR no.12:1552-1555 '61. (MIRA 16:11)

1. Voronezhskiy sel'skokhozyaystvennyy institut. Predstavleno akademikom AN UkrSSR Yu.A. Mitropol'skim [Mytropol's'kyi, IU.O.].

SOBOLEVSKIY, P.Ye.

Equations of a parabolic type in Banach space with an unbounded variable operator having a constant field of determination. Dokl. AN Azerb. SSR 17 no.6:447-450 '61. (MIRA 14:8)

1. Voronezhskiy sel'skokhozyaystvennyy institut. Predstavleno akademikom AN AzerbSSR Z.I. Khalilovym.
(Operators (Mathematics))

89603

S/020/61/136/002/006/034
C 111/ C 333

16.3500

AUTHOR: Sobolevskiy, P. Ye.

TITLE: Local and Nonlocal Theorems of Existence for Nonlinear Second-Order Parabolic Equations

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 292-295

TEXT: Let Ω be a bounded domain of the m-dimensional space with the boundary S. The author investigates the existence of the solution of

(1) $v'_t - a_{ik}(t,x,v,v'_{x_1}, \ldots, v'_{x_m})\, v''_{x_i x_k} = f(t,x,v,v'_{x_1},\ldots, v'_{x_m})$

which satisfies the initial condition

(2) $v(0,x) = v_0(x)$

and one of the conditions

(3) $v(t,x) = 0$

or

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Local and Nonlocal Theorems of Existence for Nonlinear Second-Order Parabolic Equations

$$a_{ik}(t,x,v,v'_{x_1},\ldots,v'_{x_m})\,v'_{x_k}\cos(n,x_i)+\sigma(t,x,v,v'_{x_1},\ldots,v'_{x_m})v=0$$

n is the normal vector to S. The author assumes that S and all functions in (1) and (3) are sufficiently smooth and that the form $a_{ik}\gamma_i\gamma_k$ is positive definite, while the function σ is nonnegative. The problem (1), (2), (3) is reduced in (Ref. 2,3) to Cauchy's problem for the ordinary differential equation

(4) $v' + A(t,v)\,v = f(t,v),\ v(0) = v_o$

in $L_p(\Omega)$. If v belongs to a certain set, then $A(t,v)$ is a linear operator in $L_p(\Omega)$ which is defined by the elliptic differential expression

(5) $$-a_{ik}z''_{x_ix_k}$$

and by one of the boundary conditions

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Local and Nonlocal Theorems of Existence for Nonlinear Second-Order Parabolic Equations

(6) $z = 0$ or $a_{ik} z'_{x_k} \cos (n, x_i) + \sigma z = 0$

(the a_{ik} and σ depend on t, x, v, v'_{x_i}). The theory of equations in the Hilbert space with positive-definite self-adjoint operator developed in (Ref.3) can be transferred to differential equations (4) with such operators. The author shows that from the priciple of Schauder it follows the local theorem of existence for (4) and the local theorem of existence for the classical solution of (1), (2), (3). If an apriori estimation

(10) $\sup_{0 \leq t \leq T} \| A^{\varrho}(t, v) \; v \|_{L_p} \leq C_p(T)$

is possible for one ϱ, then the nonlocal theorem of existence holds. The author succeeds in obtaining such an apriori-estimation for the simpler problem:

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Local and Nonlocal Theorems of Existence for Nonlinear Second-Order Parabolic Equations

(11) $v'_t - a_{ik}(t,x)\, v''_{x_i x_k} + a_i(t,x,v)\, v'_{x_i} + a(t,x,v) = 0$

and

(12) $v(t,x) = 0$ or $a_{ik}(t,x) v'_{x_k} \cos(n, x_i) + \sigma(t,x,v) v = 0$.

The estimation has the form

(24) $\| A(t) v \|_{L_p} \leq F_p(T)$.

S. L. Sobolev, M. A. Krasnosel'skiy and S. G. Kreyn are mentioned. There are 13 references: 12 Soviet and 1 Japanese.

[Abstracter's note: (Ref.3) is a paper of the author in Doklady Akademii nauk SSSR, 1960, 130, 2 .]

ASSOCIATION: Voronezhskiy sel'skokhozyaynstvennyy institut (Voronezh Agricultural Institute)

PRESENTED: July 15, 1960, by S. L. Sobolev, Academician

SUBMITTED: July 7, 1960

Card 4/4

23803

16.4600 16.3500

S/020/61/138/001/007/023
C 111/ C 222

AUTHOR: Sobolevskiy, P. Ye.

TITLE: Parabolic equations in the Banach space with an unbounded variable operator the fractional power of which has a constant domain of definition

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 1, 1961, 59-62

TEXT: The author transfers a part of his earlier results (Ref. 1: DAN, 123, no. 6 (1958); Ref. 2: DAN 130, no. 2 (1960) to Banach spaces.

In January 1959 the author reported about the present paper in the seminar on functional analysis at the Voronezh State University.

The author considers the problem

$$\frac{dv}{dt} - A(t)\,v = 0 \quad (\tau < t \leq T, \tau \in [0, T)), \; v(\tau) = v_0 \qquad (1)$$

X

where $v(t)$ is the sought function, $t \in [\tau, T]$, with values in the Banach space E; $A(t)$ $(0 \leq t \leq T)$ -- linear operator in E; $\frac{dv}{dt}$ -- derivative (limit value of the corresponding difference relation

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with respect to the norm of E). For every $t \in [0,T]$ let $A(t)$ have a domain of definition $D[A(t)]$ everywhere dense in E. For every λ with $Re\,\lambda \geqslant 0$ let the operator $A(t) + \lambda I$ have a bounded inverse operator where

$$\| [A(t) + \lambda I]^{-1} \| \leqslant c [|\lambda| + 1]^{-1}. \qquad (2)$$

Then fractional powers of $A(t)$ are defined (Ref. 3: M. A. Krasnosel'skiy, P. Ye. Sobolevskiy, DAN 129, no. 3 (1959)).

Let $\varrho \in (0,1)$ and l be an integer so that $\varrho_1 = 1 - l\varrho \in (0, \varrho]$.
Let $A^{\varrho}(t)A^{-\varrho}(\tau)$ be bounded for all $t, \tau \in [0,T]$; let the operator $A^{-\varrho_1}(t)A^{\varrho_1}(\tau)$ admit the closure up to a bounded operator. Let

$$\| \Delta [A(t), A(\tau)] \| \leqslant C |t - \tau|^{1 - \varrho + \varepsilon}, \qquad (3)$$

where $C > 0$, $\varepsilon \in (0, \varrho]$ and $\Delta[\ldots]$ denotes each of the bounded operators $A^{\varrho}(t)\,A^{-\varrho}(\tau) - I$, $A^{\varrho}(t)\,A^{-\varrho}(\tau) - A^{-\varrho_1}(t)\,A^{\varrho_1}(\tau)$

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(if $\varrho \geq \frac{1}{2}$ then it concerns only the second operator).

Theorem 1 asserts that there exists an operator function $U(t,\tau)$ defined for all $0 \leq \tau \leq t \leq T$ with values in the space of bounded linear operators over E so that for every $v_0 \in E$ (1) has a unique for all $t \geq \tau$ continuous and for $t > \tau$ continuously differentiable solution

$$v_\tau(t) = U(t,\tau)\, v_0 \tag{6}$$

where for $v_0 \in D[A(\tau)]$ the vector function $v_\tau(t)$ is continuously differentiable and for $t = \tau$ it satisfies (1). The author gives numerous properties and estimations for $U(t,\tau)$, e. g.:
$U(t,\tau)$ is uniformly continuous in t and τ for all $t \geq \tau$; $U(t,t) = I$, and for all $0 \leq \tau \leq s \leq t \leq T$ it holds

$$U(t,\tau) = U(t,s)\, U(s,\tau) \tag{4}$$

for all $0 \leq \tau < t \leq T$ and $\varrho \in [0,T]$ it holds

$$\| A^{\alpha}(t)U(t,\tau)A^{\beta}(\tau) \| \leq C(\varrho_0)|t-\tau|^{\beta-\alpha} \quad (0 \leq \beta \leq \alpha \leq \alpha_1 < 1+\varepsilon), \tag{7}$$

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$$\|A^{\alpha}(\xi)[U(t+\Delta t,\tau) - U(t,\tau)]A^{-\beta}(\tau)\| \le C(\alpha,\beta,\gamma)\,\Delta t^{\gamma-\alpha}|t-\tau|^{\beta-\gamma}$$

$$(0 \le \alpha \le \xi,\ 0 \le \beta \le \gamma < 1+\varepsilon,\ 0 \le \gamma - \alpha < 1) \qquad (8)$$

Then the problem

$$\frac{dv}{dt} + A(t)\,v = f(t) \quad (0 \le t \le T),\ v(0) = v_0 \qquad (11)$$

is considered.

Theorem 2: Let the vector function f(t) satisfy

$$\|f(t) - f(\tau)\| \le C|t-\tau|^{\delta} \quad [(t,\tau) \in [0,T],\ C > 0,\ 0 < \delta < 1) \qquad (12)$$

Then for every $v_0 \in E$

$$v(t) = U(t,0)\,v_0 + \int_0^t U(t,\tau)\,f(\tau)\,d\tau \qquad (13)$$

defines a unique solution of (11) continuous for all $t \geq 0$ and continuously differentiable for $t > 0$. If $v_0 \in D[A(0)]$ then $v(t)$ is continuously

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S/020/61/138/001/007/023
C 111/ C 222

Parabolic equations in the Banach ...

There are 5 Soviet-bloc references.

ASSOCIATION: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: December 8, 1960, by J. G. Petrovskiy, Academician

SUBMITTED: December 7, 1960

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S/020/61/138/002/009/024
C111/C222

AUTHOR: Sobolevskiy, P.Ye.

TITLE: Evaluation of the Green's function for second-order parabolic partial differential equations

PERIODICAL: Akademiya nauk SSSR. Doklady, v.138, no.2, 1961, 313-316

TEXT: Let Ω be an open finite region of the n-dimensional space bounded by a closed surface S of the class $A^{(1,\lambda)}$. Let $x = (x_1, x_2, \ldots, x_n)$. Let a_{ik} $(i,k = 1,2,\ldots,n)$ and $a(x)$ be defined on $\bar{\Omega}$. Let the $\partial a_{ik}(x)/\partial x_n$ and $a(x)$ be continuous on $\bar{\Omega}$ and satisfy the Hölder condition in Ω. Let $\sigma(y)$ be defined and continuous on S. Let $u_{ik}(x) = a_{ki}(x)$,

$$\sum_{i,k=1}^{n} \gamma_i \gamma_k a_{ik}(x) \geq \lambda_o \sum_{i=1}^{n} \gamma_i^2 \text{ for all } \gamma_1, \ldots, \gamma_n \text{ and a } \lambda_o > 0 ;$$

$a(x) \geq a_o > 0$ and $\sigma(y) \geq 0$. Let $v_o(x)$ be continuous on $\bar{\Omega}$.
The author considers the problem

Card 1/9

$$\frac{\partial v}{\partial t} - \sum_{i,k=1}^{n} \frac{\partial}{\partial x_i}\left[a_{ik}(x)\frac{\partial v}{\partial x_k}\right] + a(x)v = 0 \quad (t>0,\ x\in \Omega) \qquad (1)$$

$$\lim_{\substack{x\to y\\ x\in N_y}} \sum_{i,k=1}^{n} a_{ik}(x)\frac{\partial v}{\partial x_k}\cos(\mathbf{N}_y, x_i) + \sigma(y)v = 0 \quad (t>0,\ y\in S) \qquad (2)$$

$$v(0,x) = v_0(x) \quad (x\in \bar{\Omega}), \qquad (3)$$

where $\mathbf{N}_y$ - - vector of the outer normal to S in y.
The solution reads

$$v(t,x) = \int_{\Omega} G(t;\ x,y)v_0(y)dy, \qquad (4)$$

where the Green's function $G(t;x,y)$ is continuous in $(0,\infty)\times\Omega\times\bar{\Omega}$, and in $(0,\infty)\times\Omega\times\Omega$ one time continuously differentiable with respect to t and two times with respect to x, satisfies (1) and (2), is non-negative and symmetrical with respect to x and y. Furthermore it holds

$$G(t+\tau;\ x,y) = \int_{\Omega_2} G(t;\ x,z)G(\tau;\ z,y)dz \qquad (5)$$

for all $t, \tau > 0$.

Theorem 1 : Let $t_o > 0$. If $t \in (0, t_o]$ then it holds

$$0 \leq G(t;\ x,y) \leq C(t_o) \exp\left\{-\frac{\delta(t_o)r_{xy}^2}{t}\right\} t^{-n/2} \qquad . \qquad (6)$$

If $t \geqslant t_o$ then

$$0 \leq G(t;x,y) \leq C(t_o)\exp\left\{-a_o t\right\} ; \qquad (7)$$

here $C(t_o)$, $\delta(t_o) > 0$.

Theorem 2 : Let $\nu_o \in (0,1)$, $\varepsilon_o \in (0, n/2)$, $\nu \in [0, \nu_o]$, $\varepsilon \in (0, \varepsilon_o]$.
If $t \in (0, t_o]$ then

$$r_{xy}^{-\nu}\left|G(t;\ x,z) - G(t;\ y,z)\right| \leqslant$$

$$\leqslant C(t_0,\ \nu_0,\ \varepsilon)\exp\left\{-\frac{\delta(t_0,\ \nu_0,\ \varepsilon)r^2}{t}\right\}\cdot\min\left\{t^{-\frac{n+\nu}{2}+\varepsilon}\ r^{-2\varepsilon},\ t^{-\frac{n+\nu}{2}-\varepsilon}\right\}, \quad (8)$$

where $r = \min\left\{r_{xz},\ r_{yz}\right\}$. If $t \geqslant t_0$ then

$$r_{xy}^{-\nu}\left|G(t;x,\ z) - G(t;\ y,\ z)\right| \leqslant C(t_0,\ \nu_0)\ \exp\left\{-\ a_0 t\right\}. \quad (9)$$

Theorem 3 : Let $\sigma(y)$ satisfy

$$\left|\sigma(y_1) - \sigma(y_2)\right| \leq C\left|y_1 - y_2\right|^h \qquad (C > 0,\ 0 < h < 1) \quad . \quad (10)$$

If $t \in (0, t_0]$ then

$$\left|\frac{\partial}{\partial x_i}\ G(t;\ x,\ y)\right| \leqslant$$

$$\leq C(t_o, \mathcal{E}_o) \exp\left\{ - \frac{\delta(t_o, \mathcal{E}) r_{xy}^2}{t} \right\} \cdot \min\left\{ t^{-\frac{n+1}{2} + \mathcal{E}} r_{xy}^{-2\mathcal{E}}, \; t^{-\frac{n+1}{2} - \mathcal{E}} \right\}. \qquad (11)$$

If $t \geqslant t_o$ then

$$\left| \frac{\partial}{\partial x_i} G(t; x, y) \right| \leq C(t_o) \exp\left\{ - a_o t \right\}. \qquad (12)$$

for the mixed derivatives it follows with the aid of (5) :

$$\left| \frac{\partial^2}{\partial x_i \partial y_k} G(t; x, y) \right| \leq$$

$$\leq C(t_o, \mathcal{E}) \exp\left\{ - \frac{\delta(t_o, \varepsilon)}{t} r_{xy}^2 \right\} \cdot \min\left\{ t^{-\frac{n+2}{2} + \mathcal{E}} r_{xy}^{-2\mathcal{E}}, \; t^{-\frac{n+2}{2} - \mathcal{E}} \right\} \qquad (13)$$

for $t \in (0, t_o]$

$$\frac{\partial^2}{\partial x_i \partial y_k} G(t;\ x,y)\Big| \leqslant C(t_o)\exp\Big\{-a_o t\Big\} \quad \text{for } t \geqslant t_o \qquad (14)$$

Theorem 4 : Let (10) be satisfied. Let $\nu_o \in (0, \min\{\lambda, h\})$ and $\nu \in [0, \nu_o]$. If $t \in (0, t_o]$ then

$$r_{xy}^{-\nu}\Big|\frac{\partial}{\partial x_i} G(t;x,\ z) - \frac{\partial}{\partial y_i} G(t;\ y,\ z)\Big| \leqslant \qquad (16)$$

$$\leqslant C(t_o, \nu_o, \varepsilon)\exp\Big\{-\frac{\delta(t_o, \nu_o, \varepsilon) r^2}{t}\Big\} \cdot \min\Big\{t^{-\frac{n+1+\nu}{2}+\varepsilon} r^{-2\varepsilon}, t^{-\frac{n+1+\nu}{2}-\varepsilon}\Big\},$$

where $r = \min\{r_{xz}, r_{yz}\}$. If $t \geqslant t_o$ then

$$r_{xy}^{-\nu}\Big|\frac{\partial}{\partial x_i} G(t;x,\ z) - \frac{\partial}{\partial y_i} G(t;y,\ z)\Big| \leqslant C(t_o, \nu_o)\exp\Big\{-a_o t\Big\}\ . \qquad (17)$$

Since $S \in A^{(1,\lambda)}$, there exists an $r_o > 0$ so that for every $x \in \Omega$ being distant from S less than r_o there exists a next point $p_x \in S$; obviously $x \in N_{p_x}$. Let

$$\frac{dv}{dT_{p_x}} = \sum_{i,k=1}^{n} a_{ik}(x) \frac{\partial v}{\partial x_k} \cos (N_{p_x}, x_i) \quad . \tag{18}$$

Theorem 5 : For $t \in (0, t_o]$ it holds

$$\left| \frac{d}{dT_{p_x}} G(t;x, y) \right| \leqslant$$

$$\leqslant C(t_o, \varepsilon) \exp \left\{ - \frac{\delta(t_o, \varepsilon) r_{xy}^2}{t} \right\} \cdot \min \left\{ t^{-\frac{n+1}{2} + \varepsilon} r_{xy}^{-2\varepsilon}, \ t^{-\frac{n+1}{2} - \varepsilon} \right\} . \tag{19}$$

For $t \geqslant t_o$ it holds

$$\left| \frac{d}{dT_{p_x}} G(t;x, y) \right| \leqslant C(t_o) \exp \left\{ - a_o t \right\} \quad . \tag{20}$$

Theorem 6 : Let $\nu_o \in (0, \lambda)$, $\nu \in [0, \nu_o]$. If $t \in (0, t_o]$ then

$$r_{xy}^{-\nu} \left| \frac{\partial}{\partial T_{p_x}} G(t;x, z) - \frac{\partial}{\partial T_{p_y}} G(t;y, z) \right| \leq$$

$$\leq C(t_o, \nu_o, \varepsilon) \exp\left\{ - \frac{\delta(t_o, \nu_o, \varepsilon) r^2}{t} \right\} \cdot \min\left\{ t^{-\frac{n+1+\nu}{2} + \varepsilon} r^{-2\varepsilon}, t^{-\frac{n+1+\nu}{2} - \varepsilon} \right\} \quad (21)$$

where $r = \min \{ r_{xz}, r_{yz} \}$. If $t \geqslant 0$ then

$$r_{xy}^{-\nu} \left| \frac{\partial}{\partial T_{p_x}} G(t; x,z) - \frac{\partial}{\partial T_{p_y}} G(t;y,z) \right| \leq C(t_o, \nu_o) \exp\left\{ - a_o t \right\}. \quad (22)$$

Theorem 7 : Let $x, y, z \in S$ and $t \in (0, t_o]$. Then it holds

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Evaluation of the Green's ... S/020/61/138/002/009/024
C111/C222

$$\left|\frac{d}{dT_x} G(t;\ x,\ y)\right| \leqslant$$

$$\leqslant C(t_0,\ \varepsilon) \exp\left\{-\frac{\delta(t_0,\ \varepsilon)\, r_{xy}^2}{t}\right\} \cdot \min\left\{t^{-\frac{n+1-\lambda}{2}+\varepsilon} r_{xy}^{-2\varepsilon},\ t^{-\frac{n+1-\lambda}{2}-\varepsilon}\right\}; \quad (23)$$

$$r_{xy}^{-\nu}\left|\frac{d}{dT_x} G(t;\ x,\ z) - \frac{d}{dT_y} G(t;\ y,\ z)\right| \leqslant \quad (24)$$

$$\leqslant C(t_0, \nu_0, \varepsilon) \exp\left\{-\frac{\delta(t_0,\ \nu_0,\ \varepsilon)\, r^2}{t}\right\} \cdot \min\left\{t^{-\frac{n+1-\lambda+\nu}{2}+\varepsilon} r_{xy}^{-2\varepsilon},\ t^{-\frac{n+1-\lambda+\nu}{2}-\varepsilon}\right\},$$

where $r = \min\{r_{xz},\ r_{yz}\}$.

The given estimations can be applied for the investigation of fractional powers of elliptic operators.

There is 1 Soviet-bloc and 1 non-soviet-bloc reference.

ASSOCIATION: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: December 8, 1960, by I.G. Petrovskiy, Academician

SUBMITTED: December 7, 1960

Card 9/9

MAZ'YA, V.G.; SOBOLEVSKIY, P.Ye.

Generating operators of semigroups. Usp.mat.nauk 17 no.6: 151-154 N-D '62. (MIRA 16:1)
(Operators (Mathematics)) (Groups, Theory of)

SOBOLEVSKIY, P.Ye.

Green's functions of elliptic operators of any power (including integral powers). Dokl. AN SSSR 142 no.4:804-807 F '62. (MIRA 15:2)

1. Voronezhskiy sel'skokhozyaystvennyy institut. Predstavleno akademikom I.G. Petrovskim.
(Potential, Theory of)
(Operators(Mathematics))

KRASNOSEL'SKIY, M.A.; SOBOLEVSKIY, P.Ye.

Structure of a set of solutions to parabolic equations. Dokl. AN SSSR 146 no.1:26-29 S '62. (MIRA 15:9)

1. Voronezhskiy gosudarstvennyy universitet. Predstavleno akademikom I.G. Petrovskim.
(Differential equations) (Operators (Mathematics))

S/020/62/146/004/003/015
B112/B186

AUTHOR: Sobolevskiy, P. Ye.

TITLE: Second-order differential equations in Banach space

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 4, 1962, 774 - 777

TEXT: The problem $v'' + A(t)v' + B(t) = f(t)$ $(0 \leqslant t \leqslant T)$; $v(0) = v_0$, $v'(0) = v'_0$ (1) is considered in a Banach space E. A function $v(t)$ is said to be a solution of problem (1) if it satisfies (1) and if the functions $v''(t)$, $A(t)v'(t)$, and $B(t)v(t)$ are continuous on $[0,T]$. Theorem 1 states that problem (1) will have a unique solution subject to the following five conditions: if $A(t)$ is the generating operator of a strongly continuous semi-group $\exp\{-\tau A(t)\}$ $(\tau \geqslant 0)$, the norm of which satisfies the inequality $\|\exp\{-\tau A(t)\}\| \leqslant \exp\{-\delta\tau\}$ $(\delta > 0)$; (7) if the domain D of definition of the operator $A(t)$ is independent of t; if $A(t)A^{-1}(0)$ is twice strongly continuously differentiable; if $B(t)A^{-1}(0)$ is strongly continuously differentiable; if $f(t)$ is continuously differentiable, and if v_0 and v'_0

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Second-order differential... S/020/62/146/004/005/015
B112/B186

are contained in D. Furthermore, certain non-linear problems and a problem with a small parameter $\varepsilon > 0$ at the derivative $v''(t)$ are considered. The solution of the latter one is shown to tend to the solution of a degenerated first-order equation. The method applied is different from that of B. Mityagin (Izv. AN AzerbSSR, ser. fiz.-matem., No. 1 (1961)).

ASSOCIATION: Voronezhskiy sel'skokhozyaystvennyy institut (Voronezh Agricultural Institute)

PRESENTED: March 28, 1962, by I. G. Petrovskiy, Academician

SUBMITTED: March 27, 1962

Card 2/2

SOBOLEVSKIY, P.Ye.

Use of the method of fractional powers of operators in analyzing Navier - Stokes equations. Dokl. AN SSSR 155 no.1:50-53 Mr '64. (MIRA 17:4)

1. Voronezhskiy sel'skokhozyaystvennyy institut. Predstavleno akademikom M.A.Lavrent'yevym.

SOBOLEVSKIY, P.Ye.

Study of Navier - Stokes equations using methods of the theory of parabolic equations in Banach spaces. Dokl. AN SSSR 156 no. 4:745-748 Je '64. (MIRA 17:6)

1. Predstavleno akademikom S.L.Sobolevym.

KRASNOSEL'SKIY, M.A.; SOBOLEVSKIY, P.Ye.

Structure of a set of solutions to a parabolic equation. (MIRA 17:7)
Ukr. mat. zhur. 16 no. 3:319-333 '64.

SOBOLEVSKIY, P. Ye.

Coercitivity inequalities for abstract parabolic equations.
Dokl. AN SSSR 157 no.1:52-55 Jl '64 (MIRA 17:8)

1. Predstavleno akademikom I.N. Vekua.

[illegible], Ya.D.; [illegible], [illegible]

A differential equation with an unbounded [illegible] operator in a Banach space. [illegible] zap. [illegible] Ser. fiz.-mat. [illegible] [illegible]:[illegible]
(MIRA [illegible]:[illegible])
1963.

SOBOLEVSKIY, P.Ye.

Generalized solutions to first-order differential equations in Banach space. Dokl. AN SSSR 165 no.3:486-489 N '65. (MIRA 18:11)

1. Voronezhskiy sel'skokhozyaystvennyy institut. Submitted April 12, 1965.

SOBOLEVSKIY, . I.

"Discoloration of Lead Crystal, in Glass Production," Leg. Prom., 7, No. 4, 1946. Engr.

1ST AND 2ND ORDERS PROCESSES AND PROPERTIES INDEX 3RD AND 4TH ORDERS

SOBOLEVSKIY, S. I.

CA

19

The decolorization of lead glass. S. I. Sobolevskii and O. S. Shikher. *Legkaya Prom.* 8, No. 4, 25(1948). The use of Ni salts is described briefly. M. S.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

GINZBURG, D.B.; FIGUROVSKIY, I.A.; SOBOLEVSKIY, S.I.

Efficiency promotion of the gas supply system at the Gusev Crystal Glass Works. Gaz.prom. 4 no.9:22-26 S '59. (MIRA 12:11)

(Gusev--Glass manufacture) (Gas producers)

SAVONICHEV, G.V.; FIGUROVSKIY, I.A.; SOBOLEVSKIY, S.I.; BYKOV, V.V.

Preparing lead crystal in a pot furnace. Stek.i ker. 18 no.5:9-11 My '61. (MIRA 14:5)

(Glass furnaces)

SOBOLEVSKIY, S.V.

Sobolevskiy, S.V.

USSR/Engineering - Measuring Instruments

Card 1/1 Pub. 103 - 9/25

Authors : Vinokurskiy, S. A., and Sobolevskiy, S. V.

Title : V-166 instrument used for measuring the thickness of coatings

Periodical : Stan. i instr. 1, page 25, Jan 1955

Abstract : The All-Union Scientific Research Institute for Medical Instruments and Equipment, designed and constructed a new-type of instrument for measuring the thickness of anti-magnetic coatings on magnetic metals. A description is presented of the above mentioned instrument, together with technical data. Illustration.

Institution : .....

Submitted : .....

SOBOLEVSKIY, S.V.

VINOKURSKIY, S.A., SOBOLEVSKIY, S.V.

The IMU-1 instrument for measuring the power of ultrasonic waves.
Priborostroenie no.11:30 N '56. (MIRA 10:1)
(Ultrasonic waves--Measurement)

VINOKURSKIY, S.A.; SOBOLEVSKIY, S.V.

Devices for controlling the thickness of a coating (B-22 and B-21) (MIRA 11:5)
Med.prom. 12 no.4:46-50 Ap '58.

1. Vsesoyuznyy nauchno-issledovatel'skiy institut meditsinskogo instrumentariya i oborudovaniya.
(ELECTROPLATING)

VINOKUROVSKIY, S.A.; SOBOLEVSKIY, S.V.

Instruments for measuring the thickness of coatings. Stan.i instr. 29 no.5:38-39 My '58. (MIRA 11:7)
(Magnetic instruments)

PAVLOV, N.V., inzh.; BASKIN, M.A., inzh.; SOBOLEVSKIY, S.Yu., inzh.

Layou+ ~f an exposed BKZ 160-100F boiler unit operating on pulverized coal. Energomashinostroenie 7 no.4:35-37 Ap '61. (MIRA 14:7)

(Boilers)

SOBOLEVSKIY, T.F.

Some characteristics of the occurrence and cost of gold.
Kolyma 21 no.1:37-41 Ja '59. (MIRA 12:6)
(Gold mines and mining--Costs)

SOBOLEVSKIY, V.I.

SOBOLEVSKII, V.I. Zamechatel'nye mineraly. Moskva, Gos. izd-vo geolog. lit-ry, 1949. 218 p. DLC: Unclass.

SO: LC, Soviet Geography, Part I, 1951, Uncl.

SOBOLEVSKIY, V.I.; PAVLITSKAYA, Ye.I.

[How to prospect for fluorite] Kak iskat' fliuorit. Moskva, Gos. izd-vo geol. lit-ry, 1952. 23 p. (MLRA 7:3)
(Fluorite)

SOBOLEVSKIY, V.I.

[Brief course in descriptive mineralogy] Kratkii kurs opisatel'noi mineralogii. Moskva, Mosk.gornyi in-t im. I.V.Stalina, 1957. 161 p. (MIRA 11:7)
(Mineralogy--Classification)

NAKHIMZHAN, Oskar Emzich; SOBOLEVSKIY, V. I., kand. geol.-miner. nauk, red.; MANOLE, M.G., red.; TYAGUNOVA, Z.I., red.; PLAKSHE, L.Yu., tekhn. red.

[Dictionary of mineralogical terms in five languages]Piatiiazychnyi slovar' mineralogicheskikh nazvanii. Pod red.Sobolevskogo, V.I. Moskva, Glav.red.inostr. nauchno-tekhn.slovarei Fizmatgiza, 1962. 347 p. (MIRA 16:3)
(Dictionaries, Polyglot) (Mineralogy--Dictionaries)

SHLIPPE, Sergey Aleksandrovich; SINITSINA, Yekaterina Fedorovna; SOBOLEVSKIY, V.I., kand. geol.-miner. nauk, red.; MURONETS, I.I., red. izd-va; KOLCHANOV, V.P., spets. red.; PLAKSHE, L.Yu., tekhn. red.

[German-Russian geological and mineralogical dictionary] Nemetsko-russkii geologo-mineralogicheskii slovar'. Pod red. V.I.Sobolevskogo. Moskva, Fizmatgiz, 1962. 472 p. (MIRA 15:11)

(German language—Dictionaries—Russian)
(Geology—Dictionaries) (Mineralogy—Dictionaries)

SOV/112-59-5-8512

8(6)

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 5, p 16 (USSR)

AUTHOR: Sobolevskiy, V. M.

TITLE: Elastic Stressed State of an Anisotropic Round Cylindrical Pipe in an Anisotropic Elastic Medium, the Pipe Being Subjected to an Internal Pressure, an Axial Force, and Radial Heat Flow

PERIODICAL: Dokl. AN BelSSR, 1957, Vol 1, Nr 3, pp 83-88

ABSTRACT: A theoretical investigation of the problem is submitted.

Card 1/1

SOV/124-58-4-4548

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 4, p 125 (USSR)

AUTHOR: Sobolevskiy, V.M.

TITLE: The Elastic and Elastic-plastic State of Stress in a Round Cylindrical Pipe in an Elastic Medium Under the Action of Internal Pressure, Axial Force, and Radial Heat Flow (Uprugoye i uprugo-plasticheskoye napryazhennoye sostoyaniye krugovoy tsilindricheskoy truby v uprugoy srede pod deystviyem vnutrennego davleniya, osevoy sily i radial'nogo teplovogo potoka)

PERIODICAL: Uch. zap. Belorussk. in-t nar. kh-va, 1957, Nr 3, pp 207-252

ABSTRACT: The paper investigates the elastic-plastic deformation in an isotropic cylindrical pipe in an elastic medium, subjected to the action of a uniform internal pressure, an axial force, and a temperature which is the function of the radius. The cases of a Hooke-type medium and a Winkler-type medium are analyzed. The solution is based on the assumption that there is one zone of plastic state next to the interior surface of the pipe.

V. A. Lomakin

1. Pipes--Stresses 2. Pipes--Elasticity 3. Pipes--Deformation 4. Pipes--Temperature factors 5. Pipes--Test methods

Card 1/1

SOBOLEVSKIY, V.M.

Elastic and elastic-and-plastic strained conditions of a hollow spere in an elastic medium under the action of inside pressure and radial heat flow. Izv. vys. ucheb. zav.; energ. no.3:103-110 Mr '58. (MIRA 11:5)

1. Belorusskiy institut narodnogo khozyaystva imeni V.V. Kuybysheva. (Elastic plates and shells)

SOV/170-59-3-7/20

AUTHOR: Sobolevskiy, V.M.

TITLE: Elastic and Elastic-Plastic Strained State of an Unevenly Heated Revolving Circular Cylindrical Pipe (Uprugoye i uprugo-plasticheskoye napryazhennoye sostoyaniye neravnomerno nagretoy vrashchayushcheysya krugovoy tsilindricheskoy truby)

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 3, pp 52-61 (USSR)

ABSTRACT: This is a report delivered in the institution mentioned below (see Association) on 12 April 1957. The author investigated the elastic and elastic-plastic strained state of a circular cylindrical pipe revolving with a constant angular velocity and being subjected to a uniform internal and external pressure, an axial force and a radial thermal flow. The pipe is in an elastic state up to certain limiting values of the angular velocity, pressures and temperature differences. At sufficiently high values of these quantities a plastic zone arises within the cross section of the pipe. At a further increase of them a purely plastic state of the entire cross section sets in, and the pipe can function only under condition of reinforcing the material. The author derives formulae for the reinforcement function and radial and tangential stresses in the pipe for the cases when its material obeys the general law of reinforcement or the linear law of reinforcement beyond the limit of elasticity. The formulae derived hold for any temperature function varying

Card 1/2

SOBOLEVSKIY, V.M.

State of elastic and elastopolastic stress in an unevenly heated rotating circular cylindrical tube. Vestsi AN BSSR. Ser. fiz.-tekh. nav. no.3:119-128 '59. (MIRA 13:3)
(Elastic plates and shells)

S/124/60/000/003/016/017
A005/A001

Translation from: Referativnyy zhurnal, Mekhanika, 1960, No. 3, pp. 114-115, # 3787

AUTHOR: Sobolevskiy, V. M.

TITLE: The Elastic and Elastic-Plastic Stress State of a Hollow Sphere in an Elastic Medium Under the Effect of Internal Pressure and Radial Steady Heat Flow

PERIODICAL: Uch. zap. Belorussk. in-ta nar. kh-va, 1959, No. 5, pp. 191-211

TEXT: The author considers a special case of the problem, solved by him (see: Izv. vyssh. uchebn. zavedeniy, Energetika, 1958, No. 3, pp. 103-110 - RZhMekh, 1959, No. 1, p. 800), on the elastic and elastic-plastic stress states of a hollow sphere in an elastic medium under the effect of internal pressure and radial unsteady heat flow. This special case is the case of a steady heat flow. The equation of heat conductivity for this special case is integrated under the following boundary conditions: The temperatures at the internal and external surfaces of the sphere and the temperature at an arbitrary sphere

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S/124/60/000/003/016/017
A005/A001

The Elastic and Elastic-Plastic Stress State of a Hollow Sphere in an Elastic Medium Under the Effect of Internal Pressure and Radial Steady Heat Flow

of the elastic medium are given. The formulae obtained for the temperature distribution function in the sphere and in the elastic medium were inserted into formulae derived in the author's previous work for the stresses in the hollow sphere and in the elastic medium at purely elastic and elastic-plastic states of the sphere. The cooling of the external elastic medium caused by the internal medium inside the hollow sphere is considered. It is assumed that the cold period, in the course of which the temperature of the medium within the hollow sphere is kept constant, is limited. The dependence of the cooling zone radius of the elastic medium on the duration of the cold period is found. A graph of this dependence is plotted. A numerical example of the stress calculation is given. The formulae for calculating the stresses inside the elastic space surrounding the sphere hollow are added, which pertain to the elastic and elastic-plastic stress states. A numerical example is given.

I. N. Danilova

Card 2/2

SOBOLEVSKIY, V.M.

Some cases of integration of an ordinary differential equation describing the stressed state of an anisotropic and nonuniformly heated disc. Vestsi AN BSSR. Ser. fiz.-tekh. nav. no.3:17-22 '62. (MIRA 18:3)

SOBOLEVSKIY, V.M.

Some cases of integration of an ordinary differential equation describing the stressed state of an anisotropic inhomogeneous nonuniformly heated hollow sphere. Vestsi AN BSSR. Ser. Fiz.-tekh. nav. no.2:20-29 '63. (MIRA 17:1)

AID P - 4042

Subject : USSR/Power

Card 1/1 Pub. 26 - 31/31

Author : Sobolevskiy, V. V., Eng.

Title : Ioffe, Ye. F. Operativnaya rabota na podstantsiyakh vysokogo napryazheniya (Operation of high-voltage substations) Gosenergoizdat, 1954. (Book review)

Periodical : Elek. sta., 11, 62-64, N 1955

Abstract : The author reviews this book on duties and functions of substation personnel and criticizes strongly errors and incorrect statements made. The reviewer also makes some suggestions on possible improvements in the book and recommends its revision and re-editing.

Institution : None

Submitted : No date

14(5) SOV/92-58-8-15/36

AUTHOR: Sobolevskiy, V.V., Senior Engineer

TITLE: Cementing of Boreholes in Siberia (Tsementirovka skvazhin v usloviyakh Sibiri)

PERIODICAL: Neftyanik, 1958, Nr 8, p 19 (USSR)

ABSTRACT: The author states that under Siberian winter conditions it is not practical to use conventional borehole cementing equipment mounted on a heavy duty truck. There is always the risk that the truck may be blocked by heavy snow, and that the transmitting lines of the equipment may freeze. Therefore engineers often perfer to carry out the cementing operation by using the pumps of a rig. However, the use of these pumps creates additional difficulties and complicates the operation. In the opinion of the author it would be desirable to build a cementing unit mounted on two sleds, one sled for carrying engines and pumps which are covered, and the other for carrying the 15-20 m^3 water tank. The

Card 1/2

mixer and the receptacle may remain outside during the operation, while the sleds have to be placed close together. The suggested unit must be able to generate a pressure of 150 atm.

ASSOCIATION: Tobol'skaya nefterazvedka (The Tobol'sk Prospecting Office)

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SOBOLEVSKIY, V.V.

Industrial production of well rigs. Neftianik 7 no.4:7 Ap '62. (MIRA 15:11)

1. Nachal'nik proizvodstvenno-tekhnicheskogo otdeleniya Tyumenskogo geologicheskogo upravleniya.
(Tyumen' Province—Oil well drilling rigs)

SOBOLEVSKIY, V.V.

Results of investigating gas liberation in mining sections with heavy loads at the face. Izv. DGI 42:189-196 '64. (MIRA 18:11)

BLASYAK, Ye.; LAYDLER, K.; PAVLIKOVSKIY, S.; SOBOLEVSKIY, Ya.; SOBOLEVSKIY, L.; POLYAKOV, N.N. [translator]; AVTSIN, I.Ye., red.; BEN'KOVSKIY, S.V., red.; KOGAN, V.V., tekhn. red.

[Technology of fixed nitrogen; synthetic ammonia] Tekhnologiia sviazannogo azota; sinteticheskii ammiak. By E.Blasiak i dr. Moskva, Gos. nauchno-tekhn. izd-vo khim. lit-ry, 1961. 263 p. (MIRA 14:10)

(Ammonia) (Nitrogen compounds)

SOBOLEVSKIY, Yevgeniy Alekseyevich; USTINOV, Aleksandr Dmitriyevich [deceased]; SHUVALOV, A.F., otv. red.; NOVIKOVA, Ye.S., red.; MARKOCH, K.G., tekhn. red.

[Signal distortion in radiotelegraphy] Iskazheniia signalov na radiotelegrafnykh sviaziakh. Moskva, Gos. izd-vo lit-ry po voprosam sviazi i radio, 1962. 129 p. (MIRA 15:2)
(Radiotelegraph)

IVANOV, G.V., inzh.; SOBOLEVSKIY, Ye.A., inzh.; ALTUNIN, V.I., inzh.

Determination of the frequency bandwidth of the rise and fall of a signal with respect to time. Vest. sviazi 24 no.12:6-8 D '64 (MIRA 18:2)

Sobolevskiy Yu. A.

PHASE I BOOK EXPLOITATION 635

Makarochkin, Mikhail Fedorovich, Doctor of Technical Sciences and Sobolevskiy, Yu.A., Candidate of Technical Sciences

Fundamenty pod mashiny (Foundations for Machinery) Minsk, Gos. izd-vo BSSR, 1958. 113 p. 3,000 copies printed.

Ed.: Chernyak, I.; Tech. Ed.: Karpinovich, Ya.

PURPOSE: This textbook is intended for students specializing in construction engineering, and for engineers, and builders.

COVERAGE: The textbook presents essential information on problems in the design and construction of foundations for impact machinery, machines employing crankshaft mechanisms, and turbines. A brief outline of the theory of vibration in foundations on a solid base is included and a classification of soils (including their properties) necessary for calculation of loads and stresses is presented. There are 30 Soviet references.

Card 1/5

SOBOLEVSKIY, Yu.A., kand. tekhn. nauk, dots.

Effect of hydrodynamic pressure on physical conditions of slopes of irrigation canals. Sbor. nauch. rab. Bel. politekh. inst. no.77:3-22 '59. (MIRA 13:3)
(Irrigation canals and flumes)

SOB[illegible], I.

We are heading toward improvement. Biuletyn Wzor.

p. 1 (Szklo I Ceramika. Vol. 8, no. 3, Mar. 1957. Warszawa, Poland)

Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 2, February 1958

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Periodicals: KOSMOS. SERIA A: BIOLOGIA Vol. 7, no. 5, 1958.

SOBOLEWSKA, M. Oxygen as an indicator of temperature changes in the Quaternary period. p. 559.

Monthly List of East European Accessions (EEAI) LC Vol. 8, No. 4, April 1959, Unclass.

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Epidemics of diphtheria during the past year. Pediat. polska 26 no. 9:1043-1044 Sept. 1951. (CIML 21:3)

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RZUCIDLO, L.; RUDZKI, E.; SOBOLEWSKA, M.; OSTROWSKI, J.

Antigenic Wassermann component in phosphatides of Mycobacterium tuberculosis and saprophytic bacilli. Med. dosw. mikrob. 5 no.1:39-49 1953. (CLML 24:5)

1. Of the Dermatological Clinic of Warsaw Medical Academy and of the Institute of Dermatology and Venereology in Warsaw.

RZUCIDLO, L.;RUDZKI, E.;GARNUSZEWSKI, Z.;SOBOLEWSKA, M.

Behavior of phosphatides in Mycobacterium tuberculosis in reaction with sera of tuberculous patients. Med. dosw. mikrob. 5 no.2:223-230 1953.
(CLML 25:1)

1. Of the Institute of Dermatology and Venereology in Warsaw and of the First Dermatological Clinic of Warsaw Medical Academy.

ZWIERZ, J.; DURLAKOWA, I.; LOBODZINSKA, M.; SOBOLEWSKA, M.

Comparative studies on serological methods used most frequently in diagnosis of leptospirosis. Med. dosw. mikrob. 5 no.2:231-236 1953. (CLML 25:1)

1. Of Wroclaw Branch of the State Institute of Hygiene; Leptospirosis center.

SOBOLEWSKA, Maria

SOBOLEWSKA, Maria; DYNER, Eugenia

Preventive application of chloromycetin during the epidemic of whooping cough in a nursery. Pediat. polska 29 no.5:537-541 May 54.

1. Wykonano pod kierunkiem prof. dr med. J.Bogdanowicza Kierownika Kliniki Chorob Zakaznych Wieku Dzieciecego A.M. w Warszawie.

(WHOOPING COUGH, prevention and control, chloramphenicol)

(CHLORAMPHENICOL, prev. of whooping cough)

SOBOLEWSKA, Maria

A case of peptic ulcer in 8-year old boy. Pediat.polska 30 no.2:157-158 Feb '55.

1. Z Miejskiego Szpitala dla Dzieci Nr. 1 w Warszawie. Dyrektor: prof. dr med. R.Stankiewicz. Warszawa, Glogera 6 m. 10

(PEPTIC ULCER, in infant and child
diag. & ther.)

GLOWACKA, W.; SOBOLEWSKA, S.

Webster-Habel's method of standardization of anti-rabies vaccine. (CIML 20:6)
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1. Summary of the report given at 10th Congress of the Polish Microbiological and Epidemiological Society held in Gdansk, Sept. 1949. (Warsaw.)

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RZUCIDLO, L.; RUDZKI, E.; STACHOW, A.; MACKIEWICZ, I.; SOBOLEWSKA, S.

Research on the increase in pathogenicity for mice of Salmonella typhi and Staphylococcus aureus under the influence of yeastlike fungi or yeast zymosan. Med. dosw. mikrob. 9 no.2:125-130 1957.

1. Z Instytutu Dermatologii i Wenerologii w Warszawie i Warszawskiej Wytworni Surowic i Szczepionek.

(SALMONELLA INFECTIONS, exper.
eff. of yeastlike fungi & zymosan on pathogenicity of S. typhi in mice (Pol))

(MICROCOCCAL INFECTIONS, exper.
eff. of yeastlike fungi & zymosan on pathogenicity of M. pyogenes aureus in mice (Pol))

(YEASTS
zymosan, eff. on pathogenicity of Micrococcus pyogenes aureus & Salmonella typhi in mice (Pol))

(POLYSACCHARIDES, eff.
zymosan on pathogenicity of Micrococcus pyogenes aureus & Salmonella typhi in mice (Pol))

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eff. on pathogenicity of Micrococcus pyogenes aureus & Salmonella typhi in mice (Pol))

SOBOLEWSKA, S.

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(SALMONELLA INFECTIONS, immunol.
quantitative determ. of mouse pathogenicity of Sal. typhi using zymosan as immunity-decreasing factor (Pol))

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Sobolewski H., Prof. Dr. Eng. **Modern Steam Piston Engines.** „Nowoczesne tłokowe silniki parowe" Przegląd Mechaniczny. No 1—3, 1950, pp. 18—34, 24 figs., 2 tabs.

Power. Inlet steam pressure. Number of revolutions. Superheating. Consumption of steam. Slide valves. Tendency to eliminate cylinder lubrication. Fixed engines, marine engines, motor-car engines.

SOBOLEWSKI, H.

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SOURCE: East European Accessions List (EEAL) LC VOL. 5, No. 6 June 1956

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