RUTMAN, M.A.

Integral representation of functions forming a Markov series. Dokl. AN SSSR 164 no.5:989-992 O '65. (MIRA 18:10)

1. Odesskiy gidrometeorologicheskiy institut. Submitted March 19, 1965.

RUTMAN M. A.

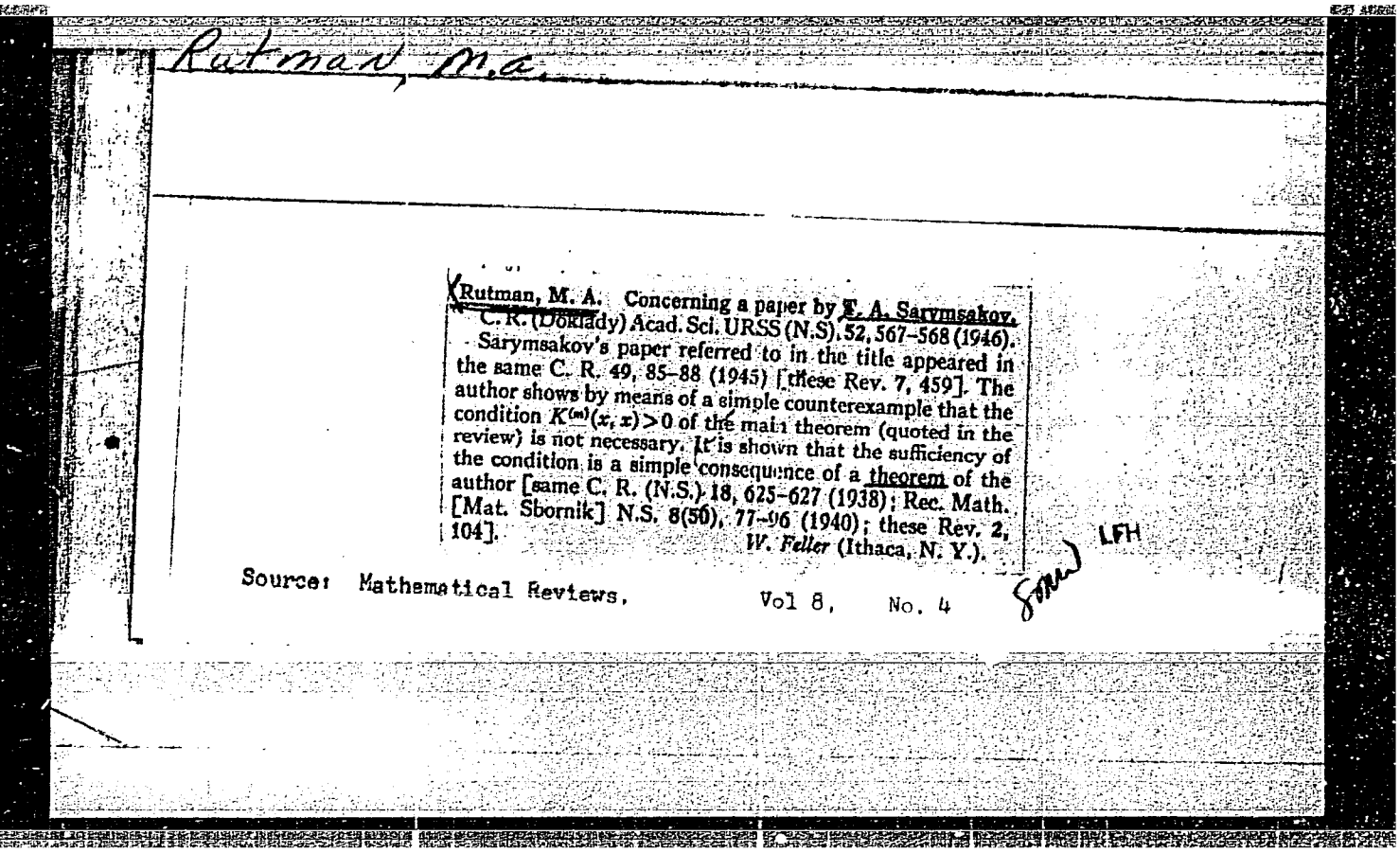
Ob odnom spetsial'nom klasse vpolne nepreryvnykh lineynykh operatorov. DAN, 18 (1938), 625-628

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

RUTICKI, M. A.

Sur les opérateurs totalement continus linéaires laissant invariant un certain cône.
Matem. SB., 8 (50), (1940), 77-96.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948



Rutman, M.a.

Rutman, M. A. Concerning a paper by E. A. Sarymsakov. C. R. (Doklady) Acad. Sci. URSS (N.S.) 52, 567–568 (1946).

Sarymsakov's paper referred to in the title appeared in the same C. R. 49, 85–88 (1945) [these Rev. 7, 459]. The author shows by means of a simple counterexample that the condition $K^{(m)}(x, x) > 0$ of the main theorem (quoted in the review) is not necessary. It is shown that the sufficiency of the condition is a simple consequence of a theorem of the author [same C. R. (N.S.) 18, 625–627 (1938); Rec. Math. [Mat. Sbornik] N.S. 8(56), 77–96 (1940); these Rev. 2, 104].

W. Feller (Ithaca, N. Y.).

LFH

Source: Mathematical Reviews, Vol 8, No. 4

RUTMAN, M. A.

Krein, M. G., and Rutman, M. A. Linear operators leaving invariant a cone in a Banach space. Uspehi Matem. Nauk (N.S.) 3, no. 1(23), 3–95 (1948). (Russian)

This paper gives proofs and extensions of earlier work of the authors on the existence and properties of characteristic vectors and characteristic numbers of a monotone linear operator A in a partially ordered Banach space B. The various hypotheses of the theorems describe the nature of the cone K of nonnegative elements and impose conditions, such as complete continuity, on the operator A. The results, in particular § 6, extend such classical theorems as those of Frobenius and Perron on matrices with nonnegative elements, and the theorem of Jentzsch on integral operators with positive kernel. Section 9 has some results on certain nonlinear, completely continuous operators. The existence theorems are derived from the fixed point theorem for convex compact subsets of a locally convex linear topological space.

Section 1 deals with semi-groups in a Banach space B; that is, with convex sets K which are semi-groups under addition in B. The notation $x \leqq y$ means that $y-x \in K$; $x \ll y$ means that $y-x \in$ (interior of K). Define K^* as the set of f such that $f \in B^*$ and $f(x) \geqq 0$ for all x in K. Call f in K^* positive (strictly positive) if there exists x in K (if for all $x \neq 0$ in K) $f(x) > 0$. Typical preliminary results are as follows. Theorem 1.1. Let K be a cone, not all of B, and let G be a linear subspace of B containing an interior point of K, then every positive linear functional on G can be extended to a positive linear functional on B. Theorem 1.2. If K_1 is a semi-group with interior and K_2 a semi-group not containing an interior point of K_1, then there exists a positive f in K_1^* with $-f$ in K_2^*.

Section 2 introduces cones; that is, closed semi-groups K such that x and $-x$ both in K implies $x=0$. Call K normal if there exists $\delta > 0$ such that $x_i \in K$ and $|x_i| = 1$, $i = 1, 2$, imply $|x_1 + x_2| > \delta$. Call K minihedral if $\sup(x, y)$ and $\inf(x, y)$ exist for every x, y in K. If K has an interior, K^* is normal. If, moreover, K is minihedral, K^* is minihedral. If K has an interior point u, K is normal if and only if the interval $\{x \mid -u \leqq x \leqq u\}$ is contained in a sphere. In

Source: Mathematical Reviews, Vol 10 No. 4

a finite-dimensional space a cone K is minihedral if and only if there exist linearly independent elements for which K is the set of nonnegative linear combinations of these elements. Kakutani's theorem on the representation of abstract M spaces can be rephrased as follows: a Banach space B is isomorphic to the space of continuous functions on a compact Hausdorff space if and only if there exists in B a normal, minihedral cone with interior.

Section 3 studies common fixed points and characteristic vectors of an Abelian family of operators and of their adjoints. (In sections 1–8 all operators are additive and continuous.) Theorem 3.3. Let K be a semi-group with interior and let G be a commuting family of linear transformations A with $AK \subseteq K$. Then there exists a positive φ in K^* which is a common characteristic vector of all the conjugate operators A^*, A in G, in fact, for each A in G there exists for each A a positive λ_A such that $A^*\varphi = \lambda_A \varphi$. Theorem 3.1. If in addition there is a common fixed point $u \gg 0$ of all A in G, then φ is a common fixed point of the A^*, A in G. This has as a corollary the existence of Banach limits for bounded real functions on Abelian groups.

Section 4 introduces the complex extension $\bar{B}$ of a given real Banach space B: B is the space of couples $z = x + iy$ of elements of B with the usual norm

$$|z| = \max_{0 \le \mu \le 2\pi} |x \cos \mu + y \sin \mu| ;$$

and the extension $\bar{A}$ of A: $\bar{A}z = Ax + iAy$. The spectrum, resolvent set, and resolvent of A are defined to be the corresponding quantities for $\bar{A}$. Call K a reflexive cone if B is a reflexive space (so $K = K^{**}$) and both K and K^* have interiors. Theorem 4.1. Let K be a reflexive cone and A an operator mapping the interior of K into itself and such that $x \in K$ and $Ax = 0$ implies $x = 0$. Then there exist $x \neq 0$ in K, $f \neq 0$ in K^*, and a positive number ρ such that $Ax = \rho x$, $A^*f = \rho f$, and the spectrum S_A of A lies in the circle $|\lambda| \leqq \rho$.

These results are applied in § 5 to Lorentz mappings in Hilbert space H. Fix an orthogonal basis $\{e_i\}$ in H; for $x = \sum_1^\infty \xi_i e_i$, let $Jx = \xi_1 e_1 - \sum_2^\infty \xi_i e_i$. Then K, the set of x such that $(Jx, x) \geqq 0$, $(e_1, x) \geqq 0$, is a reflexive cone; in fact, $K^* = K$. If $(Ju, u) > 0$, then $[x, y] = -(Jx, y)$ is an inner product defining the original topology in the hyperplane H_u = (set of all y such that $(Ju, y) = 0$). Call Γ a Lorentz mapping if it is a one-to-one function carrying H onto itself so that $(J\Gamma x, \Gamma y) = (Jx, y)$ for each x, y in H. It is shown that every Lorentz mapping is linear and either Γ or $-\Gamma$ maps K into itself. Theorem 5.1. Let Γ be a Lorentz mapping taking K into K; then Γ has a characteristic vector v

Source: Mathematical Reviews, Vol. 10 No. 4

Krein, M. G. & Rutman, M. A. Part I/1

RUTMAN, M. A.

Rutman, M. A. - "On a result achieved by N. Bogolyubov and S. Kreyn", Sbornik trudov In-ta matematiki (Akad. nauk Ukr. SSR), No. 12, 1949, p. 119-26, - Bibliog: 7 items.

SO: U-411, 17 July 53, (Letopis 'Zhurnal 'nykh Statey, No. 20, 1949).

RUTMAN, M.A.

Krein, M. G., and Rutman, M. A. Linear operators leaving invariant a cone in a Banach space. Amer. Math. Soc. Translation no. 26, 128 pp. (1950).
Translated from Uspehi Matem. Nauk (N.S.) 3, no. 1(23), 3–95 (1948); these Rev. 10, 256.

Source: Mathematical Reviews, Vol. 12 No. 5

RUTMAN, M.A.

USSR/ Mathematics - Topology

Card 1/1 Pub. 22 - 6/51

Authors : Rutman, M. A.

Title : About some operational equations having an application in the Lyapunov stability theory for a semi-regulated space

Periodical : Dok. AN SSSR 101/2, 217-220, Mar 11, 1955

Abstract : In order to clarify conditions under which the theory of stability by Lyapunov may take place, a system of operational differential equations with a varying argument along the semi-axis was solved for a semi-regulated space. This resulted in a series of theorems which are presented. Three references: 2 USSR and 1 German (1930-1948).

Institution : The Hydrometeorological Insitute, Odessa

Presented by: Academician, A. N. Kolmogorov, December 14, 1954

SUBJECT USSR/MATHEMATICS/Differential equations

AUTHOR RUTMAN M.A.

TITLE Special criteria of stability in the sense of Liapunov for some systems of linear partial differential equations.

PERIODICAL Doklady Akad, Nauk 101, 993-996 (1955)
reviewed 6/1956

The author establishes spectral criteria of stability which follow from the results of the author's paper on operator equations (Doklady Akad. Nauk 101, No.2 (1955).

1. Let A be a linear bounded operator in the complex Banach space and let be given the boundary value problem

$$\frac{\partial^n y}{\partial t, \partial t_2 \cdots \partial t_n} - A_y = x_o(t_1, t_2, \ldots t_n)$$

$$y(0, t_2 \ldots t_n) = x_1(t_2 \ldots t_n); \; y(t, 0, \ldots t_n) = x_2(t_1, t_3 \ldots, t_n)$$

$$y(t_1, t_2, \ldots, 0) = x_n(t_1, t_2, \ldots t_{n-1})$$

$x_o, x_1, \ldots x_n$ defined and continuous for $0 \leq t < \infty$, with compatible boundary conditions. If a real α satisfies the inequation

Doklady Akad. Nauk 101, 993-996 (1955)

$$\alpha > \max_{\lambda \in S_A} \operatorname{Re} \sqrt[n]{\lambda} \qquad (S_A \text{ - spectrum of } A),$$

and if the $x_0, x_1, \ldots, x_n$ satisfy the conditions

$$\overline{\lim} \frac{\| x_0(t_1, t_2 \ldots t_n) \|}{e^{\alpha(t_1+t_2+\ldots+t_n)}} < \infty$$

$$(1) \qquad \overline{\lim} \frac{\| x_j(t_1 \ldots t_{j-1}, t_{j+1} \ldots t_n) \|}{e^{\alpha(t_1+t_2+\ldots+t_n)}} < \infty \qquad (j=1,2,\ldots n),$$

then the solution of the boundary value problem satisfies the condition

$$(2) \qquad \overline{\lim} \frac{\| y(t_1, t_2, \ldots t_n) \|}{e^{\alpha(t_1+\ldots.+t_n)}} < \infty \quad .$$

But if

$$(3) \qquad \alpha \leq \max_{\lambda \in S_A} \operatorname{Re} \sqrt[n]{\lambda} \ ,$$

then there exist compatible boundary values $x_1, \ldots, x_n$ and a function x which

satisfy (1) but not the solution of the boundary value problem (2). If (3) is a strong inequation, then there always exists an element $y_o \in E$ for which the homogeneous boundary value problem

$$\frac{\partial^n y}{\partial t_1 \dots \partial t_n} - Ay = 0 \qquad y(0,t_2 \dots t_n) = y(t_1,0,\dots t_n) = \dots = y(t_1 t_2 \dots 0) = y_o$$

has a solution not satisfying (2).

2. Let be given the boundary value problem

$$\frac{\partial^n y}{\partial t_1 \partial t_2 \dots \partial t_n} - A_1 \frac{\partial^{n-1} y}{\partial t_2 \partial t_3 \dots \partial t_n} - A_2 \frac{\partial^{n-1} y}{\partial t_1 \partial t_3 \dots \partial t_n} - \dots - A_{12} \frac{\partial^{n-2} y}{\partial t_3 \dots \partial t_n} -$$

$$\dots - A_{n-1,n} \frac{\partial^{n-2} y}{\partial t_1 \dots \partial t_{n-2}} - \dots - A_{12\dots n} y = x_o(t_1 t_2 \dots t_n)$$

$$y(0,t_2 \dots t_n) = x_1(t_2 \dots t_n) \dots\dots\dots y(t_1 t_2 \dots 0) = x_o(t_1 t_2 \dots t_{n-1})$$

Doklady Akad. Nauk 101, 993-996 (1955) CARD 4/4 PG - 65

$x_0, x_1, \ldots x_n$ defined and continuous in $\begin{cases} 0 \leq t_1 < \infty \\ 0 \leq t_j \leq b_j \qquad j=2,3,\ldots n \end{cases}$,

and the operators $A_1 \ldots A_{12\ldots n}$ be defined and bounded in the Banach space E. In order that for all bounded boundary values and all bounded x_0 there exists a bounded solution, it is necessary and sufficient that the spectrum of the operator A_1 lies in the open left side half-plane. If on the other hand one single point of the mentioned spectrum lies in the open right side half-plane, then there exists a system of bounded boundary values for which the corresponding homogeneous boundary value problem has an unbounded solution.

INSTITUTION: The Hydro-meteorological Institute Odessa

SUBJECT USSR/MATHEMATICS/Functional analysis CARD 1/3 PG - 366
AUTHOR RUTMAN M.A.
TITLE On the stability of the solutions of certain systems of linear differential equations with variable coefficients.
PERIODICAL Doklady Akad. Nauk 108, 770-773 (1956)
reviewed 11/1956

The author considers differential boundary value problems in the complex Banach space under the assumption that the right hand sides and the initial conditions are continuous functions of n real variables $t_1,\dots,t_n$ and their range of values belongs to the mentioned Banach space. Spectral attributes of stability (Rutman, Doklady Akad. Nauk 101, 6, (1955)) are extended to some differential equations with non-stationary linear operators. A boundary value problem is called stable if to all (compatible) initial conditions and right hand sides being uniformly bounded with respect to the norm, there corresponds a solution which also is uniformly bounded with respect to the norm. The principal result of the paper is the following theorem: Let be given the boundary value problem

$$\frac{\partial^n y}{\partial t_1 \partial t_2 \dots \partial t_n} - A(t_1,t_2,\dots,t_n)y = x_0(t_1,t_2,\dots,t_n)$$

$$y(0,t_2,\dots,t_n) = x_1(t_2,\dots,t_n);\ y(t_1,0,\dots,t_n) = x_2(t_1,t_3,\dots,t_n);\ \dots\dots;$$

$y(t_1,t_2,\ldots,0) = x_n(t_1,t_2,\ldots,t_{n-1})$; $0 \leq t_1,t_2,\ldots,t_n < \infty$.

Let $A(t_1,\ldots,t_n)$ be compact and let

$$\alpha(t_1,t_2,\ldots,t_n) = \max_{\lambda \in S_{A(t_1,t_2,\ldots t_n)}} \operatorname{Re} \sqrt[n]{\lambda}$$

(S_A - spectrum of A)

$$\alpha_\omega = \overline{\lim_{t_j \to \infty}} \alpha(t_1,t_2,\ldots t_n).$$

If then $\alpha > \alpha_\omega$ and if for sufficiently small $\varepsilon > 0$ and sufficiently large $\sum t'_j$, $\sum t''_j$ from the inequation

$$\sum |t'_j - t''_j| \leq 1$$

there follows the inequation

$$\|A(t'_1,t'_2,\ldots,t'_n) - A(t''_1,t''_2,\ldots,t''_n)\| < \varepsilon ,$$

then

$$\overline{\lim}\, e^{-\alpha \Sigma t_j} \|y(t_1, t_2, \ldots, t_n)\| < \infty,$$

if only

$$\overline{\lim}\, e^{-\alpha \Sigma t_j} \|x_0(t_1, t_2, \ldots, t_n)\| < \infty$$

$$\overline{\lim}\, e^{-\alpha \Sigma t_j} \|x_k(t_1, \ldots, t_{k-1}, t_{k+1}, \ldots, t_n)\| < \infty \qquad (k=1,2,3,\ldots,n).$$

Beside of this theorem the proof of which is given in the fundamental features, for other boundary value problems two similar theorems are formulated without proof. The firstly mentioned theorem permits an inversion.

INSTITUTION: Hydro-meteorologic Institute, Odessa.

SUBJECT USSR/MATHEMATICS/Functional analysis CARD 1/1 PG - 811
AUTHOR RUTMAN M.A.
TITLE Operator equations in semi-ordered spaces and some qualitative theorems for partial linear differential equations.
PERIODICAL Uspechi mat.Nauk 12, 1, 234-238 (1957)
reviewed 6/1957

The author considers some partial linear systems of differential equations in the Banach space. It is assumed that the independent variables vary in infinite intervals. For the increase of the solutions of the considered equations exact estimations are given. From these estimations criteria of stability in the sense of Ljapunov can be obtained. The obtained results base on earlier general investigations of the author (Doklady Akad.Nauk 101, no.2 and no.6 (1955)).

L 16162-66 EWT(d) IJP(c)

ACC NR: AP5026976 SOURCE CODE: UR/0020/65/164/005/0989/0992

AUTHOR: Rutman, M. A.

ORG: Odessa Hydrometeorological Institute (Odesskiy gidrometeorologicheskiy institut)

TITLE: Integral representation of functions generating Markov sequences

SOURCE: AN SSSR. Doklady, v. 164, no. 5, 1965, 989-992

TOPIC TAGS: Markov process, continuous function, integral function

ABSTRACT: A finite system of functions $\phi_0(x), \phi_1(x), \ldots, \phi_n(x)$ with $a < x < b$ is called a Chebyshev sequence or a T-system if

$$D\begin{pmatrix}\Phi_0, \Phi_1, \ldots, \Phi_n\\ x_0, x_1, \ldots, x_n\end{pmatrix} = \begin{vmatrix}\Phi_0(x_0) & \Phi_0(x_1) & \ldots & \Phi_0(x_n)\\ \Phi_1(x_0) & \Phi_1(x_1) & \ldots & \Phi_1(x_n)\\ \ldots & \ldots & \ldots & \ldots\\ \Phi_n(x_0) & \Phi_n(x_1) & \ldots & \Phi_n(x_n)\end{vmatrix} > 0$$

Card 1/3 UDC: 517.512

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ACC NR: AP5026976

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for every $x_0 < x_1 < \ldots < x_n$ belonging to (a,b). A finite or infinite system of functions $\varphi_0(x), \varphi_1(x), \ldots, \varphi_k(x), \ldots$ is called a Markov sequence or an M-system if

$$D\begin{pmatrix}\varphi_0, \varphi_1, \ldots, \varphi_k\\ x_0, x_1, \ldots, x_k\end{pmatrix} > 0 \quad \text{for} \quad x_0 < x_1 < \cdots < x_k \text{ belonging to } (a, b) \quad (k = 0, 1, 2, \ldots).$$

Every Chebyshev sequence of continuous functions (only such functions are considered here) is transferred into a Markov sequence via the linear transformation

$$\varphi_k(x) = \sum_{j=0}^{n} c_{kj}\Phi_j(x) \quad (k = 0, 1, \ldots, n),$$

Markov sequences only were considered here. If

$$1, \psi_1^{(1)}(x), \psi_2^{(1)}(x), \ldots$$

was a Markov sequence for $a < x < b$ and $\psi_1(x)$, an increasing right-continuous function, then

$$1, \psi_1(x) \int_a^x \psi_1^{(1)} d\psi_1, \int_a^x \psi_2^{(1)} d\psi_1, \ldots$$

was a Markov sequence with $\alpha \in (a,b)$. Moreover, every finite Markov (Chebyshev) sequence could be extended in infinitely many ways. A Markov (Chebyshev) sequence defined in the interval (a,b), could be extended behind the point b (behind the

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ACC NR: AP5026976

point a) if and only if the limiting value of $\psi_1(b - 0)$ (and correspondingly, of $\psi_1(b + 0)$) was finite. Finally, every Markov (Chebyshev) sequence could be redefined in arbitrary small intervals $(a, a + \varepsilon')$ and $(b - \varepsilon'', b)$ and then could be indefinitely extended behind the two end points of the interval (a,b). Orig. art. has: 3 formulas.

SUB CODE: 12/ SUBM DATE: 16Mar65/ ORIG REF: 002/ OTH REF: 001

Card 3/3

RUTMAN, M.A.

Boundedness of the solutions to certain linear partial difference equations. Dokl. AN SSSR 159 no.2:273-275 N '64. (MIRA 17:12)

1. Odesskiy gidrometeorologicheskiy institut. Predstavleno akademikom I.G. Petrovskim.

L 46971-66 EWP(k)/EWT(m)/EWP(t)/ETI IJP(c) JH/WW/JD/HW/JG

ACC NR: AT6024944 (A,N) SOURCE CODE: UR/2981/66/000/004/0296/0302

AUTHOR: Rutman, M. M.; Cherepok, G. V.; Rudenko, V. S.

ORG: none

TITLE: Effect of furnace lining on the silicon content of deformable aluminum alloys

SOURCE: Alyuminiyevyye splavy, no. 4, 1966. Zharoprochnyye i vysokoprochnyye splavy (Heat resistant and high-strength alloys), 296-302

TOPIC TAGS: refractory, aluminum silicate, aluminum zinc alloy, magnesium containing alloy

ABSTRACT: The reaction between liquid aluminum alloys and aluminosilicate refractories used for furnace linings was studied by determining the effect of the composition of alloys of Al-Zn, Al-Mg, and Al-Zn-Mg systems on the depth of penetration of silicon into the alloys after a 20-hr contact at 750°C. The extent of this reaction was found to depend on the composition of the alloy. Small admixtures of certain elements (Be, Mn, Li) substantially affect the extent and nature of the reaction between the melt and the aluminosilicate lining. A rise in the temperature of the melt increases the rate of the reaction of all the alloys with the lining; a particularly pronounced increase in the extent of the reaction is observed in the case of aluminum alloys containing magnesium or magnesium and zinc. A classification of deformable aluminum

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L 46971-66

ACC NR: AT6024944

alloys is proposed, and the use of certain types of refractories for various alloy groups is recommended. Orig. art. has: 4 figures.

SUB CODE: 11/ SUBM DATE: None

Card 2/2

ACCESSION NR: AT4037652 S/2981/64/000/003/0105/0119

AUTHOR: Rutman, M. M.; Savin, F. I.; Balakhontsev, G. A.; Cherepok, G. V.; Zinov'yev, V. K.

TITLE: Properties of V92 alloy ingots

SOURCE: Alyuminiyevy*ye splavy*, no. 3, 1964. Deformiruyemy*ye splavy* (Malleable alloys), 105-119

TOPIC TAGS: aluminum magnesium zinc alloy, V92 alloy, continuous alloy casting, alloy heat treatment, alloy property

ABSTRACT: A technique for production-scale melting and continuous casting of V92, an aluminum-base alloy (3.75% Mg, 2.75% Zn, 0.8% Mn, 0.2% Ti) is described. Round (225—1100 mm in diameter) and flat (250 x 1400 mm) ingots were cast. The high Mg content of the alloy required addition of about 0.001% Be. No difficulties were encountered in casting round ingots. The pouring rates used corresponded to the lower limit of those used for AMg6 alloy. For ingots less

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ACCESSION NR: AT4037652

than 500 mm in diameter, a factor K = VD = 1.1 m^2/hr (where V is pouring rate and D — input diameter) should be used. In casting flat ingots special precautions had to be used to prevent formation of cracks, hot (at high pouring rates) or cold (at low pouring rates). When proper conditions are maintained strictly, sound ingots with a clean surface are obtained. Flat 250 x 1400 mm ingots were cast at a rate of 53—58 mm/min at a metal temperature of 680—700C. Immediately after casting, the ingots are homogenized to prevent cracking. All ingots had comparatively homogeneous microstructure. No appreciable segregation of Mn, Si, and Fe and no unusual segregation of Zn and Mg was observed. The density of the metal varied from 2.72 to 2.735 g/cm^3. When homogenized at 415—435C for 24 hrs, V92 alloy has a yield strength of 15—21 kg/mm^2, a tensile strength of 23—29 kg/mm^2, and an elongation of 3—6%. When solution heat treated at 450 ± 5C for 3 hrs and naturally aged for 7 days the alloy has yield strength and tensile strength to 23—28 and 28—32 kg/mm^2, respectively, with only an insignificant decrease in elongation. Orig. art. has: 15 figures and 1 table.

Card 2/2

RUTMAN, M.A.

Exponential increase of solutions to a certain class of partial differential equations. Trudy OGMI no.27:11-15 '61. (MIRA 16:6)
(Differential equations, Partial)

RUTMAN, M. A.

Criterion of the boundedness of solutions to linear partial differential equations with a leading term. Dokl. AN SSSR 147 no.4:789-792 D '62. (MIRA 16:1)

1. Odesskiy gidrometeorologicheskiy institut. Predstavleno akademikom I. G. Petrovskim.

(Differential equations, Linear)

S/020/62/147/004/007/027
B112/B186

AUTHOR: Rutman, M. A.

TITLE: Test for boundedness of solutions to linear partial differential equations having a leading term

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 4, 1962, 789 - 791

TEXT: The boundary value problem

$$\frac{\partial^{p_1+p_2+\ldots+p_n} y}{\partial t_1^{p_1}\partial t_2^{p_2}\ldots\partial t_n^{p_n}} - \sum_{(q_1 q_2\ldots q_n)} A_{q_1 q_2\ldots q_n}\frac{\partial^{q_1+q_2+\ldots+q_n} y}{\partial t_1^{q_1}\partial t_2^{q_2}\ldots\partial t_n^{q_n}} = x\,, \tag{1}$$

$$y\big|_{t_j=0} = \frac{\partial y}{\partial t_j}\Big|_{t_j=0} = \ldots = \frac{\partial^{p_j-1} y}{\partial t_j^{p_j-1}}\Big|_{t_j=0} = 0 \quad (j = 1,2,\ldots,n)$$

is considered. The families $A_{q_1\ldots q_n}(t_1,\ldots,t_n)$ (2) are assumed to be compact and to have weak variation at infinity. $A^{(\omega)}$ denotes an arbitrary limiting operator which is generated by the family $A(t_1,\ldots, t_n)$ for

Card 1/2

Test for boundedness ...

$\sum_{1}^{n} t_j \to \infty$. The following theorem is derived: $\|x(t_1, \ldots, t_n)\| < \infty$ will imply $\|y(t_1, \ldots, t_n)\| < \infty$ then and only then if no operator function

$$\Gamma^{(\omega)} = \Gamma^{(\omega)}(\lambda_1, \ldots, \lambda_n) = \left(\lambda_1^{p_1} \ldots \lambda_n^{p_n} I - \sum_{(q_1 \ldots q_n)} \lambda_1^{q_1} \ldots \lambda_n^{q_n} A^{(\omega)}_{q_1 \ldots q_n}\right)^{-1} \quad (3)$$

has singular points in the region Re $\lambda_j \geq 0$, j = 1, 2, ..., n.

ASSOCIATION: Odesskiy gidrometeorologicheskiy institut (Odessa Hydrometeorological Institute)

PRESENTED: June 16, 1962, by I. G. Petrovskiy, Academician

SUBMITTED: May 12, 1962

Card 2/2

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S/044/62/000/008/014/073
C111/C333

AUTHOR: Rutman, M. A.

TITLE: On limited solutions of some differential- and differential-difference equations

PERIODICAL: Referativnyy zhurnal, Matematika, no. 8, 1962, 42, abstract 8B189. ("Issled. po sovrem. probl. konstruktivn. teorii funktsiy.", M., Fizmatgiz, 1961, 297-299)

TEXT: Considered is the equation

$$y^{(n)} = f\left[t, y, y', \ldots, y^{(n-1)}\right] \qquad (1)$$

the right side of which is defined for $0 \leq t < +\infty$, $-\infty < y, y', \ldots y^{(n-1)} < +\infty$ and satisfies the inequality

$$\left|f\left[t, y, y', \ldots, y^{(n-1)}\right]\right| < C\left[|y| + |y'| + \ldots + |y^{(n-1)}|\right] + D \qquad (2)$$

with positive constants C and D. It is proven that each solution of (1)

Card 1/3

defined on $0 \leqslant t < +\infty$, is either limited or limited with all derivatives up to the n-th order inclusive. The theorem especially holds for every linear equation the coefficients and right side of which are limited on the half axis; this was previously known for constant coefficients (Esclangon, E., C. r. Acad. sci., 1915, 160, 475). The proof follows directly from the following generalized lemma from Hadaward-Kolmogorov (Hadaward, J., Bull. Soc. math. France; C. r. de Séances, 1914, 42, 68-72; Kolmogorov, A. N., Uch. zap. MGU, 1939, 30,3):

Let $y = f(t) \not\equiv$ constant -- a real function of class C" for $0 \leqslant t < +\infty$, let $T = \text{const} > 0$ and $M_k(T) = \sup_{0 \leqslant t \leqslant T} \frac{d^k f(t)}{dt^k}$ $(k = 0,1,2)$. If for sufficiently large $T > 0$

$$\frac{8M_0(T)}{M_1(T)} \leqslant T, \quad \text{then} \quad \frac{M_2(T)}{M_1(T)} \geqslant \frac{1}{4} \cdot \frac{M_1(T)}{M_0(T)} .$$

In particular, if for a certain sequence

$t_n \to +\infty$ $\frac{M_1(t_n)}{M_0(t_n)} \to +\infty$, then $\frac{M_2(t_n)}{M_1(t_n)} \to +\infty$.

It is then proven: If a solution defined for $0 \leq t < +\infty$ of the equation (1) tends for $t \to +\infty$ to zero, and if in (2) $D = 0$, then all derivatives of this solution up to the n-th order inclusive have this property. The theorem is, for example, applicable to linear homogeneous equations with limited coefficients. Both theorems given above also hold (without changing the proof) for the differential-difference equation

$$y^{(n)} = f\{t, y[t - \alpha_0(t)], y'[t - \alpha_1(t)], \ldots, y^{(n-1)}[t - \alpha_n(t)]\} \qquad (3)$$

where $\alpha_k(t) \geq 0$ are continuous on $0 \leq t < +\infty$ $(k = 0, \ldots, n)$; they also hold if (1) and (3) are given in Banach spaces.

[Abstracter's note: Complete translation.]

Card 3/3

RUTMAN, M.A.

Bounded solutions of linear differential and differential difference equations. Trudy OGMI no.20:3-7 '59.
(MIRA 14:10)
(Differential equations, Linear)
(Difference equations)

RUTMAN, M. A., Doc Phys-Math Sci, "Operator equations in linear semiordred space and spectral signs of solution limits for certain systems of differential equations with partial derivatives." Leningrad, 1960. (Leningrad Order of Lenin State Univ im A. A. Zhdanov). (KL, 2-61, 198).

SOV/42-14-3-20/22

16(1)
AUTHORS: Iokhvidov, I.S., Rutman, M.A.

TITLE: University Conference on Functional Analysis and its Applications

PERIODICAL: Uspekhi matematicheskikh nauk, 1959, Vol 14, Nr 3, pp 221 - 226 (USSR)

ABSTRACT: The paper contains a report on the conference on functional analysis and its applications which took place on October 20-25, 1958 in Odessa at the Hydrometeorological Institute. There were 140 participators from 8 republics of the USSR. M.G. Kreyn opened the conference. General lectures were given by G.Ye. Shilov and I.M. Gel'fand (read out by M.I. Grayev). Lectures given by : R.A. Aleksandryan, Yu.M. Berezanskiy, N.I. Vilenkin, M.I. Vishik and L.A. Lyusternik, I.M. Gel'fand and M.I. Grayev, M.I. Grayev, V.A. Il'in, L.V. Kantorovich and G.Sh. Rubinshteyn, M.G. Kreyn, M.A. Krasnosel'skiy and S.G. Kreyn, V.B. Lidskiy, M.A. Naymark, A.Ya. Povzner and I.V. Sukharevskiy, D.A. Raykov, A.N. Tikhonov and A.A. Samarskiy, S.V. Fomin, D.E. Allakhverdiyev, B.V. Bazanov, N.Ya. Vilenkin, Yu.P. Ginzburg, Yu.L. Daletskiy, E.I. Gol'dengershel', D.P. Zhelobenko, G.I. Kats, I.S. Kats, A.A. Kirillov, I.Ye. Lutsenko,

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University Conference on Functional Analysis and its Applications SOV/42-14-3-20/22

V.E. Lyantse, G.V. Maykov and S.N. Sokolov, R.G. Maksudov, V.P. Maslov, R.A. Minlos, B.S. Mityagin, V.I. Sobolev, I.I. Pyatetskiy - Shapiro, L.A. Sakhnovich, L.D. Fadeyev, S.V. Fomin, G.Ye. Shilov, Yu.L. Shmul'yan, A.V. Shtraus, M.I. Kliot-Dashinskiy, N.V. Azbelev and Z.B. Tsalyuk, K.G. Akhmedov, I.Ya. Bakel'man, M.Sh. Birman, Ya.V. Bykov, Yu.N. Valitskiy and M.K. Fage and V.G. Khriptun, B.A. Vertgeim, V.P. Glushko and S.G. Kreyn, A.I. Guseynov and A.A. Babayev, M.G. Dzhavadov, I.A. Kupriyanov, Yu.F. Korobeynik, A.I. Koshelev, O.A. Ladyzhenskaya, A.D. Lyashko, L.G. Nizhnik, M.V. Maslennikov, A.M. Molchanov, M.A. Rutman, Z.I. Rekhlitskiy, S.N. Slugin, M.V. Fedoryuk. S.D. Eydel'man, V.A. Yakubovich, G.N. Agayev, G.P. Akilov and A.M. Vershik, I.A. Bakhtin, M.L. Brodskiy, M.M. Vaynberg, I.V. Gel'man, I.Ts. Gokhberg and A.S. Markus, A.S. Dynin, M.I. Kadets, A.G. Kostyuchenko, B.M. Makarov, M.A. Krasnosel'skiy and Ya.B. Rutitskiy, Ya.D. Mamedov and R.M. Sultanov, A.S. Markus, Ye.Ya. Melamed, A.I. Perov, S.S. Ryshkov, D.V. Salekhov, P.G. Skvortsov, Sya Do-shin, and K.M. Fishman.

Card 2/3

University Conference on Functional Analysis and its Applications SOV/42-14-3-20/22

In the final session the following resolutions were passed : 1.) The next functional analytic meeting will take place in September 1959 at Baku. 2.) Delivery of the material concerning the past meeting to the editors of the Uspekhi matematicheskikh nauk for publication. 3.) Organization of a new periodical "Functional Analysis and Applications". A committee consisting of A.N. Tikhonov, Corresponding Member, AS USSR ; M.G. Kreyn, Corresponding Member, AS Ukr.SSR ; Professors Yu.M. Berezanskiy, M.A. Krasnosel'skiy and G.Ye. Shilov is commissioned to arrange the corresponding steps.

Card 3/3

16(1)
AUTHOR: Rutman,M.A. SOV/20-124-4-9/67

TITLE: Order of Exponential Increases of the Solutions of Some Sets (O Poryadke of Linear Partial Differential Equations with Particular Derivations / eksponentsial'nogo rosta resheniy nekotorykh sistem lineynykh differentsial'nykh uravneniy s chastnymi proizvodnymi)

PERIODICAL: Doklady Akademii nauk SSSR,1959,Vol 124,Nr 4,pp 764-767 (USSR)

ABSTRACT: In the domain $0 \; t_1,t_2,\ldots,t_n \; \infty$ the author considers the differential equation

$$(1) \quad \frac{\partial^{p_1+p_2+\ldots+p_n} y}{\partial t_1^{p_1} \partial t_2^{p_2} \ldots \partial t_n^{p_n}} - (q_1,q_2,\ldots,q_n) A_{q_1 q_2 \ldots q_n} \frac{\partial^{q_1+\ldots+q_n} y}{\partial t_1^{q_1} \partial t_2^{q_2} \ldots \partial t_n^{q_n}} = x.$$

Let C_E be the linear space of continuous functions $y=y(t_1,\ldots,t_n)$, $x=x(t_1,\ldots,t_n)$ with values in the Banach space E. Let the subspace $C_{E,}$ consist of the functions for which

$$\sup \; x(t_1,t_2,\ldots,t_n) \; \exp - (t_1+\ldots+t_n) \quad \infty \; .$$

Card 1/3

Order of Exponential Increases of the Solution of Some Sets of Linear Partial Differential Equations with Particular Derivations

SOV/20-124-4-9/67

Let $C_{E,+}$ be the intersection of all $C_{E,}$ for . Let ( ) be the lower bound of those for which $C_{E,}$ y , where y denotes the totality of the solutions of (1) which satisfy certain Cauchy Goursat initial conditions.

Theorem: Every boundary value problem of the considered kind has a critical value $_{o}$ so that

( ) = $_{o}$ for $_{o}$

( ) = for $_{o}$.

The totality of the solutions y for different x $C_{E,\ o}$ is contained in the subspace $C_{E,\ o}^{+}$, but it is not contained in the subspace $C_{E,\ o}$.

Card 2/3

Order of Exponential Increases of the Solution of Some Sets of Linear Partial Differential Equations with Particular Derivations

SOV/20-124-4-9/67

An effective determination of the value σ_0 is given only for some special cases (e.g. for scalar equations).
There are 4 Soviet references.

ASSOCIATION: Odesskiy gidrometeorologicheskiy institut (Odessa Hydrometeorological Institute)

PRESENTED: October 13, 1958, by I.G.Petrovskiy, Academician

SUBMITTED: October 9, 1958

Card 3/3

HUTMAN, M.M.

From production shop practice. Lit.proizv. no.2:31 Mr-Ap '54.
(MLRA 7:4)
(Founding)

RUTMAN, M.M.; SAVIN, F.I.; BALAKHONTSEV, G.A.; CHEREPOK, G.V.;
ZINOV'YEV, V.K.

Properties of ingots from the B92 alloy. Alium. splavy no.3:
105-119 '64. (MIRA 17:6)

RUTMAN, M.M., inzhener.

Liquid glass as a method to prevent excessive shrinkage of iron castings. Lit.proizv. no.10:29-30 O '56. (MLRA 9:11)
(Iron founding--Quality control)

HUTMAN, M.M.

Determining norms of metal consumption in casting. Lit.proizv. no.7:p.3 of cover O '54. (MLRA 7:12)
(Founding)

RUTMAN, M.M.

Utilizing dustlike ferrosilicon waste. Lit.proizv. no.7:28 Jl'55. (MLRA 8:10)
(Ferrosilicon)

18(5) SOV/128-59-6-19/25

AUTHOR: Rutman, M.M., Engineer

TITLE: Gravity Die Casting of Counterweight Loads

PERIODICAL: Liteynoye Proizvodstvo, 1959, Nr 6 p 42 (USSR)

ABSTRACT: In the article by Beletskiy, D. Ye."Gravity Die Casting of Counterweights for Agricultural Combines", published in "Liteynoye Proizvodstvo", Nr 4, 1957, the technology of gravity die casting for flywheels has been described. The same castings are produced at other plants by means of the centrifugal casting method. For this purpose, the dies are mounted on three pivots like on a merry-go-round. There are 2 diagrams and 2 photographs

Card 1/1

RUTMAN, M. M.

USSR/Miscellaneous - Foundry processes

Card 1/1 : Pub. 61 - 16/23

Authors : Rutman, M. M.

Title : Smelting of Cr-Ni-steel in an acid electrical-furnace

Periodical : Lit. proizv. 4, page 28, July 1954

Abstract : The difficulties involved in the smelting of Cr-Ni austenite steel, with a fixed Si content, in acid electrical-furnaces are explained. A new method for the smelting of austenite Cr-Ni steel in acid electrical-furnaces, without any of the mentioned difficulties, is briefly described.

Institution : ...

Submitted : ...

RUTMAN, M.M.

Smelting chrome-nichel steel in an acid electric furnace.
Lit.proizv. no.4:28 Jl '54. (MLRA 7:7)
(Chrome-nichel steel)

RUTMAN, M.M.

USSR

Production of Chromium-Nickel Steel in an Acid Electric Furnace. M. M. Rutman. (*Elektrich. Proizvodstvo*, 1954, (4), 28).
[In Russian] [illegible] is given of charging methods which are used to eliminate [illegible] during [illegible] steel in an acid electric furnace.

RUTMAN, M. M.

Packing (Mechanical Engineering)

Improved design for gasket ring. Lit. proizv. No. 2, 1953.

SO: Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

AUTHORS: Rutman, M.Sh., Min'kov, D.B., Vinogradova, L.V. 131-3-4/16

TITLE: The Pressing of Glass Beams on a Hydraulic Press (Pressovaniye steklobrus'yev na gidravlicheskom presse)

PERIODICAL: Ogneupory, 1958, Vol 23, Nr 3, pr 106-108 (USSR)

ABSTRACT: A hydraulic press was installed at the Podol'sk Plant, on which beams of kaolin- and highly aluminous fire clay have been pressed for some time. The press concerned is a vertical press with four columns and a pressure of 900 t, diameter of plunger: 625 mm, and a stroke of 985 mm. The liquid is pressed into the cylinder by means of a 3-plunger pump, the output being 25 l per minute, and maximum pressure 300 atmospheres excess pressure. The mass is weighed before pressing and is conveyed into the mold by means of a device which was designed by P.V. Shabanov and N.M.Semenov, calculating engineers of the above plant, and which is described in short by the authors. Before introducing the substance, the mold is coated with an emulsion consisting of 90% petroleum, 5% stearin and 5% soap. Pressing is carried out in three stages: at 40, 120 - 160 and 260-280 atmospheres excess pressure, the maximum specific

Card 1/2

pressure amounting to 370-400 kg/cm^2. The products are ejected from the mold by a special device, while the process of removing them from the press and placing them upon the lorries is carried out by means of a lifting device (fig. 1), which was developed and produced by P.F. Podshivalov, calculating engineer of the above plant, and which is described in detail. The kaolin- and highly aluminous fire clay for glass beams is obtained by burning briquettes from revolving furnaces. The characteristic of the mass may be seen from table 1. The output of the press amounts to 38 beams per shift (~5 t), the press being operated by 2 men. By pressing it was possible to improve the quality of the beams, which is shown by fig.2 and table 2, where a comparison is drawn with a ramming method. The physical values of the burned beams are shown in table 3. There are 2 figures and 3 tables.

ASSOCIATION: Podol'sk Plant for Refractories (Podol'skiy zavod ogneupornykh izdeliy)

AVAILABLE: Library of Congress

Card 2/2 1. Hydraulic presses-Design 2. Hydraulic presses-USSR
3. Refractory materials-Processing

RUMAN, R.,
P. VIZIR, Mikrobiol. Zhur. 5, No. 4, 65-76 (1938)

BELIKOV, P.F., inzh.; RUTMAN, R.A., inzh.

Electrode water level indicator housed in a protective pipe. Sbor. trud. Inst. gor. dela AN URSR no.12:98-105 '61. (MIRA 15:11)
(Liquid level indicators)

L 60234-65 EWT(1)/EPA(s)-2

ACCESSION NR: AT5013577 UR/2584/64/000/017/0121/0129 10 9 B+1

AUTHOR: Shinka, Ya. K.; Rutmanis, L. A.; Berzin'sh, Ya. Ya. 29

TITLE: Semiconductor commutator for contactless d-c motor

SOURCE: AN LatSSR. Institut energetiki. Trudy, no. 17, 1964. Poluprovodniki i ikh primeneniye v elektrotekhnike, 3. Upravlyayemyye poluprovodnikovyye vypryamitel'nyye elementy i ikh primeneniye (Semiconductors and their use in electrical engineering, 3. Controlled semiconductor rectifying elements and their use), 121-129

TOPIC TAGS: dc motor, contactless dc motor, motor commutator, semiconductor commutator

ABSTRACT: The development and testing of a contactless d-c motor are reported. The motor actually consists of an inductor-type synchronous machine combined with a thyristor "commutator"; the latter acts as an inverter whose output frequency and voltage are controlled by a master generator. Both the excitation and the armature windings are placed in the stator of a 3-phase

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L 60234-65

ACCESSION NR: AT5013577

inductor-type heteropolar motor: each tooth of the unwound rotor corresponds to a pole pair of a conventional synchronous machine. The "commutator" inverts dc into 3—17-cps ac, which corresponds to a synchronous speed of about 20—100 rpm. The "commutator" is, in fact, a 3-phase bridge-circuit inverter with capacitor-switched thyristors and separation diodes. A commutator control unit comprises a multivibrator, a slave blocking oscillator, a scaler, and output amplifiers, all designed with semiconductor elements. The new motor voltage-current/rpm and external characteristics are shown. Orig. art. has: 7 figures.

ASSOCIATION: Institut energetiki AN Latviyskoy SSR (Institute of Power Engineering, AN Latvian SSR)

SUBMITTED: 00 ENCL: 00 SUB CODE: EE, EC

NO REF SOV: 005 OTHER: 000

Card 2/2

L 05097-67 EWT(1)
ACC NR: AP6013257 SOURCE CODE: UR/0413/66/000/008/0047/0047

AUTHOR: Rutmanis, L. A. 34 B

ORG: none

TITLE: A semiconductor frequency converter. 25 Class 21, No. 180689

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 8, 1966, 47

TOPIC TAGS: frequency converter, circuit design, semiconductor device

ABSTRACT: This Author Certificate presents a semiconductor frequency converter made as a circuit with direct coupling using thyristors. The design improves the shape of the output voltage curve. Two auxiliary locking units are used for the forced commutation of the thyristors (see Fig. 1). Each of the locking units includes a direct current source which is connected in series with a fully controlled switching element, for example, a silicon controlled gate.

Card 1/2 UDC: 621.314.26:621.315.592

L 05097-67

ACC NR: AP6013257

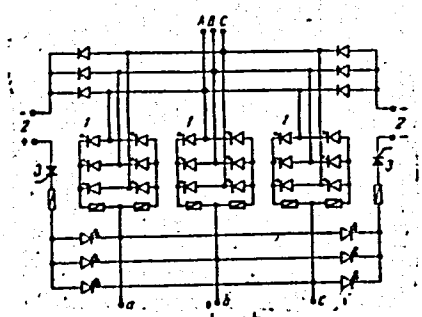

Fig. 1. 1 - thyristors of the converter; 2 - direct current source; 3 - fully controlled switching element

Orig. art. has: 1 figure.

SUB CODE: 09/ SUBM DATE: 09Mar65

Card 2/2 vmb

S/196/62/000/012/005/016
E194/E155

AUTHOR: Rutmanis, L.A.

TITLE: A mobile charging device with germanium rectifiers

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.12, 1962, 9, abstract 12 A44. (Tr. In-ta energ. i elektrotekhn. AN LatvSSR, v.11, 1961, 123-128).

TEXT: To replace motor-generator charging sets type A[illegible]-4/30 (AZD-4/30), which weigh about 460 kg for an output of 4 kW, there has been developed a semiconductor charging set type [illegible]-1 (ZUG-1) which weighs 90 kg and has an output of 4.2 kW. It is supplied from a three-phase 380-220 volt circuit with a continuous current rating of 70 A and has an output voltage which can be controlled in steps of 3 V from 60 to 77 V and an efficiency of 94-95%. The rectifier set uses six air-cooled germanium elements type [illegible]-10 (VG-10) and is trolley mounted. Supply voltage is fed through an automatic high-speed circuit-breaker to a two-winding stepdown transformer which supplies the germanium rectifier connected in three-phase bridge circuit. The voltage is controlled by a number of tappings on one phase secondary winding of the

Card 1/2

A mobile charging device with ... S/196/62/000/012/005/016
E194/E155

transformer. Charging takes place automatically with a current which diminishes in value as the charge proceeds, the value at the end of the charge being set by a switch. With this equipment it is not necessary to determine the state of discharge of the battery before connecting it for charge, because the charging current automatically adjusts itself to the appropriate value for the given degree of discharge. This is achieved by having in the rectifier output a non-linear resistance made of soft steel wire, which also protects the rectifiers and transformer against prolonged overloads. A high-speed fuse type PNB-2 (PNB-2) and a high-speed circuit-breaker provide short-circuit protection.

Abstractor's note: Complete translation.

Card 2/2

RUTMANN, V. M.

4
0
9

2695. A study of the reaction between thorium and 1-(o-arsonophenylazo)-2-naphthol-3:6-disulphonic acid (thoron). L. P. Adamovich and V. M. Rutman. *Uch. Zap. Khar'kov. Univ.*, 1954, 64; *Trudy Khim. Fak. i Nauch. Issledovatel. Inst. Khim.*, 12, 203–208; *Ref. Zhur., Khim.*, 1955, (15), Abstr. No. 31,881.—A study of the composition of the compound formed by the interaction of Th with 1-(o-arsonophenylazo)-2-naphthol-3:6-disulphonic acid (I) by Ostromyslenskii's method has shown that the components react in the ratio 1:2, the ions reacting being $Th^{\cdots\cdot}$ and a bivalent anion obtained by acidic dissociation of I. The optimum pH is 1·65. The constant of complex formation is $(7{\cdot}9 \pm 0{\cdot}9) \times 10^{4}$.

C. D. KOPKIN

RUTMAN, Z.M.

Purifying waste gases of heating units in refractory plants.
Ogneupory 30 no.9:5-10 '65. (MIRA 18:9)

1. Vsesoyuznyy institut ogneuporov.

RUTMAN, Z. M.

SOV/131-59-2-13/16

15(2)

AUTHOR: Karklit, A. K.

TITLE: External Meeting of the Scientific-Technical Council of the All-Union Institute of Refractories at the Borovichi Kombinat of Refractories (Vyyezdnaya sessiya Nauchno-tekhnicheskogo soveta Vsesoyuznogo instituta ogneuporov na Borovichskom kombinate ogneuporov)

PERIODICAL: Ogneupory, 1959, Nr 2, pp 93-95 (USSR)

ABSTRACT: In November 1958 a joint meeting of the NTS Vsesoyuznogo institutu ogneuporov (VIO, All-Union Institute of Refractories), of the Tekhnicheskiy sovet kombinata (Technical Council of the Kombinat and the Institute took place. It was devoted to the discussion of the prospects of the development of the Kombinat for the years 1959-1965. Ya. M. Vetserov reported on the prospects of development of the production and auxiliary departments. F. I. Kasper'yan on the prospects in mining industry, and K. A. Shalkov on new technological methods of producing dense refractories containing a high amount of fireclay. Engineers and technical collaborators and leading workers of the Kombinat as well as scientists of the All-Union Institute of Refractories, representatives of the Leningrad Sovnarkhoz and public organizations took part in the discussion of the reports. L. L. Dobrin spoke about the necessity of improving the production technology of pantiles. M. M. Bluvshteyn reported on the development of the Central Laboratory of the Kombinat, and Z. M. Rutman on the construction of pyrometric test plants. N. V. Pitelov emphasized the necessity of increasing the burning temperature of the products. A. K. Karklit pointed to the necessity of carrying out a number of scientific research ... in the field of technology and automation of production. V. I. Yakovlev underlined the necessity of an improvement of quality of the products. The secretary of the Borovichskiy gorodskoy komitet KPSS (Borovichi Municipal Committee of the CPSU) I. V. Smirnov pointed to the importance of comprehensive solutions in the planning of the further development of the Kombinat by taking into account the interests of the economic district as a whole. The director of the Institute V. V. Gordeyev and the director of the Kombinat M. M. Komarov summarized the results of the reports. The meeting passed a resolution on the further development of the production departments of the Kombinat. With the start of operation of the Ore Mine "Klyuchenka" the Kombinat will receive a yearly amount of about 10,000 tons of local aluminous raw material. The resolutions were submitted to the Leningrad Sovnarkhoz.

Card 1/3

Card 2/3

ASSOCIATION: Vsesoyuznyy institut ogneuporov (All-Union Institute of Refractories)

Card 3/3

GORDEYEV, N.P.; RUTMAN, Z.M.; SHIRYAYEV, S.A.

Development of the use of heat by the refractories industry.
Ogneupory 27 no.11:516-520 '62. (MIRA 15:11)

1. Vsesoyuznyy institut ogneuporov.
(Kilns)
(Refractories industry--Equipment and supplies)

1. ARASLANOVA, R. M., MINKIN, S. YU., RUTMAN, Z. V.

2. USSR (600)

4. Transplantation (Physiology)

7. Problem of tissue therapy.
Vest. khir. 72 No. 6, 1952

9. Monthly List of Russian Accessions, Library of Congress, March 1953, Uncl.

RUTMANIS, V.

From the history of the struggle of the Latvian Communist Party against the philosophical revisionism of the Latvian social democrats in 1920-1934. Vestis Latv ak SSR no.8:4-12 '62.

L 17170-63 EWP(k)/EWP(q)/EWT(m)/BDS AFFTC/ASD Pf-4 JD/HW

ACCESSION NR: AP3004298 S/0170/63/006/007/0113/0120

62
61

AUTHOR: Trakhtenberg, B. F.; Rutner, Ya. F.

TITLE: Analysis of heat processes in dies in hot stamping 16

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 6, no. 7, 1963, 113-120

TOPIC TAGS: heat process, die, hot stamping, thermal wear, rapid heating, temperature field

ABSTRACT: The article discusses the heat analysis of hot stamping for axially symmetric dies of the type of bodies of rotation, shown the advisability of employing the method of instantaneous concentrated sources and offers a general solution of the temperature-field problem. The problems of increasing the stability of dies are acquiring ever greater importance, as they predetermine in many ways the technico-economic efficiency of accurate die stamping. Investigations of the character and kinetics of the wear of dies for hot deformation and analysis of the conditions of operation permit one to conclude that the cycle of rapid heating and cooling is the leading cause of wear. 16

Card 1/2

L 17170-63

ACCESSION RN: AP3004298

Experiments have established that with a mean die temperature of 300-400° C the peak temperature in the contact zone reaches 850-900° c, and the thermal wear of the tool is due to thermal fatigue and thermal processes proper. Hence it is important to make a quantity and time evaluation of the temperature fields in a cross-section of the die according to the technological and operational characteristics of the process, as well as of the design and material of the tool. The article discusses a part of these questions, being a first attempt at an analytical computation of temperature fields in dies. Topical headings are: 1) Heat analysis of the stamping cycle by stages (with two tables so entitled); 2) Evaluation of the order of capacity of sources; 3) change to an equivalent die. Orig. has 2 photos of a die, 3 diagrams, 2 tables and 7 numbered equations.

ASSOCIATION: Industrial'nyy institut imeni V. V. Kuybysheva, Kuybyshev (Industrial Institute)

SUBMITTED: 02Mar63 DATE ACQ: 08Aug63 ENCL: 000

SUB CODE: PH NO REF SOV: 003 OTHER: 000

Card 2/2

L 41486-65 EWT(d)/T IJP(c)

ACCESSION NR: AP4041390 S/0020/64/156/006/1273/1276

AUTHORS: Kval'vasser, V.I.; Rutner, Ya.F.

TITLE: A method for finding Green's function for boundary-value problems involving the heat equation, for a line segment with end-points moving at a uniform rate

SOURCE: AN SSSR. Doklady*, v. 156, no. 6, 1964, 1273-1276

TOPIC TAGS: boundary value problem, partial differential equation parabolic equation

ABSTRACT: A method for finding GREEN's function for boundary-value problems involving the heat equation, for a line segment with end-points moving at a uniform rate. In general, boundary-value problems for the heat equation, for a region with variable boundary, lead to a system of VOLTERRA integral equations of the second kind. In the special case considered here, that of a line segment with end-points moving at a uniform rate, the heat equation is written in the form $\left(a\frac{\partial^2}{\partial z^2}-\frac{\partial}{\partial t}\right)G(z,t;z_0,t_0)=\frac{1}{2}\operatorname{sign}(z_0-z)\,\delta(z-z_0)\,\delta(t-t_0).$

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where G is the GREEN function to be determined, subject to the (first kind) boundary conditions

$$G(z, t; z_0, t_0)|_{z=v_1 t} = 0,$$

$$G(z, t; z_0, t_0)|_{z=l+v_2 t} = 0.$$

The problem is solved by first changing to a coordinate system fixed relative to the moving left end-point of the line segment (letting $\xi = z - v_1 t$, $\xi_0 = z_0 - v_1 t_0$), then taking Laplace transforms. This leads to a pair of arbitrary functions, to be determined by the boundary conditions, through an integral equation. A second application of LAPLACE transform methods yields a different equation. Finally, the solution is given by:

$$G(\xi, t; \xi_0, t_0) = \frac{1}{2\sqrt{\pi a (t - t_0)}} \exp\left[\frac{v_1}{2a}(\xi_0 - \xi) - \frac{v_1^2}{4a}(t - t_0)\right] \times$$

$$\text{where} \quad \times \sum_{k=-\infty}^{\infty} \exp\left(-k^2 \frac{l_0 v_0}{a} - k \frac{v_0 \xi_0}{a}\right) \mu(2l_0 k + \xi_0),$$

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ACCESSION NR: AP4041390

$$\mu(\xi_0) = \exp\left[-\frac{(\xi_0-\xi)^2}{4a(t-t_0)}\right] - \exp\left[-\frac{(\xi_0+\xi)^2}{4a(t-t_0)}\right], \quad v_0 = v_2 - v_1, \; L_0 = l + v_0 t_0$$

The author states that his method can be applied to the direct solution of boundary-value problems of various types.

ASSOCIATION: None

SUBMITTED: 01Feb64 ENCL: 00

SUB CODE: MA NR REF SOV: 004 OTHER: 001

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I 44146-65 EPF(n)-2/EPR/EPA(s)-2/EWG(v)/EWT(d)/T/EWA(1) Pe-5/Ps-4/Pt-7/Pu-4
IJP(c) WW

ACCESSION NR: AP5010072 UR/0170/65/008/004/0479/0484

AUTHOR: Kval'vasser, V. I.; Rutner, Ya. F.

TITLE: Green's functions of boundary-value problems for the heat conduction equation for domains with uniformly moving boundaries

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 8, no. 4, 1965, 479-484.

TOPIC TAGS: boundary value problem, heat conduction equation, Green's function determination

ABSTRACT: It is indicated that there are no general methods for solving boundary-value problems for the heat conduction equation in the case of domains with movable boundaries. The authors present a way for determining the Green's functions of boundary-value problems for the heat conduction equation in two cases: a) for a half-line with a uniformly moving boundary, and b) for a straight-line segment with a uniformly and parallel moving boundary. Using the Laplace-transform method, expressions for the Green's functions are derived in closed form for case a) for boundary conditions of the first, second, and third kinds. In case b), the Green's functions are de-

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ACCESSION NR: AP5010072

rived for three kinds of boundary conditions in a form similar to that obtained for domains with fixed boundaries. It is indicated that the Green's functions can be similarly obtained for other types of boundary conditions. Orig. art. has: 18 formulas. [LK]

ASSOCIATION: none

SUBMITTED: 17Jan64 ENCL: 00 SUB CODE: MA, TD

NO REF SOV: 005 OTHER: 000 ATD PRESS: 3247

Card 2/2 mb

L 43735-66 EWP(m)/EWT(1) WW

ACC NR: AP6030792 SOURCE CODE: UR/0376/66/002/008/1101/1106

AUTHOR: Rutner, Ya. F.; Skryabina, L. P. 40 B

ORG: Kuybyshev Polytechnic Institute im. V. V. Kuybyshev (Kuybyshevskiy politekhnicheskiy institut) 16

TITLE: Application of the Wiener-Hopf method to the solution of a boundary value problem for the heat conduction equation 21

SOURCE: Differentsial'nyye uravneniya, v. 2, no. 8, 1966, 1101-1106

TOPIC TAGS: Wiener Hopf method, integral transformation, heat conduction equation, boundary value problem, INTEGRAL TRANSFORM, HEAT CONDUCTION, FOURIER TRANSFORM

ABSTRACT: The possibility of applying the Wiener-Hopf method of integral transformations to the solution of certain boundary-value problems for the heat conduction equation is considered. The following boundary-value problem for the equation

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} \quad (t > 0) \qquad (1)$$

on the half-plane $y \geq 0$, $-\infty < x = +\infty$ with the following initial and boundary conditions

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L 43735-66
ACC NR: AP6030792

$$u(x, 0, t) = f(t)e^{-bx} \quad (b > 0), \quad x > 0, \tag{2}$$

$$\frac{\partial u(x, 0, t)}{\partial y} = 0, \quad x < 0. \tag{3}$$

where f(t) is a bounded function and the solution u(x, y, t) and its derivatives $\partial u/\partial x$, $\partial u/\partial y$ tend to zero when $x \to \pm \infty$ and $y \to \infty$. By applying the Laplace transformation with respect to t to this boundary problem and after Fourier transformation with respect to x, the differential equation (1) is reduced to a second-order ordinary differential equation for the Fourier transform U(y) and the initial and boundary conditions to corresponding initial and boundary conditions for the U(y). The general solution of the reduced boundary-value is derived and the problem of determining unknown functions is analyzed. It is shown that the final solution of the defined boundary-value problem can be derived with the aid of contour integrals whose evaluation, however, is difficult. To simplify calculations, the second approach is used. By applying the inverse of the Fourier transform and utilizing certain tables of the operational calculus, the boundary conditions are reduced to a new form. The solution of the boundary-value problem for equation (1) with initial condition (2) and transformed condition can be found with the aid of Green's function. [LK]
Orig. art. has: 19 formulas.

SUB CODE: 12/ SUBM DATE: 06Feb65/ ORIG REF: 002/ OTH REF: 001/ ATD PRESS: 5076
Card 2/2 hs

RUTNER, Ya.F., inzh.; SILIN, M.L., inzh.; TRAKHTENBERG, B.F., kand.tekhn.nauk

Simulation of temperature fields in axisymmetric sectional dies for drop forging. Vest.mashinostr. 43 no.11:53-55 N '63. (MIRA 17:2)

AP4041790 SOV/57-34-7-10/34

AUTHOR: Kval'vasser, V.I.; Rutner, Ya.F.

TITLE: On the problem of the expansion of a neutral plasma into an external magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.7, 1964, 1170-1174

TOPIC TAGS: plasma flow, magnetic field plasma effect, electromagnetic field

ABSTRACT: Maxwell's equations for the vacuum are solved in closed form for the following initial and boundary conditions expressed in cylindrical coordinates r, z: at time t = 0, the field is a uniform magnetic field parallel to the z axis and filling all space; at all times the field approaches a uniform magnetic field parallel to the z axis and of the initial magnitude as $r \to \infty$; and at time t, the electric and magnetic fields vanish for $r < vt$, where v is a constant less than the velocity of light. The equations are also solved for the following conditions expressed in rectangular Cartesian coordinates x, y, z: at time t = 0 the field is a uniform magnetic field parallel to the z axis and filling all space; at all times the field approaches a uniform magnetic field parallel to the z axis and of the initial magni-

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ACCESSION NR: AP4041990

tude as $|x| \to \infty$; and at time t, the electric and magnetic fields vanich for $v_1 t < x < v_2 t$, where v_1, v_2 are constants, $v_1 < v_2$, and both are less than the velocity of light. These solutions represent the fields of a perfectly conducting plasma expanding at constant speed into a uniform magnetic field from a line source or from a plane source. The analogous problem for a plasma expanding into a magnetic field from a point source has been discussed by S.Katz (J.of Math.Phys.2,1,1961). Orig. art. has: 37 formulas.

ASSOCIATION: none

SUBMITTED: 19Aug63 ENCL: 00

SUB CODE: ME,EM NR REF SOV: 002 OTHER: 002

2/2

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KV'AL'VASSER, V.I.; RUTNER, Ya.F.

Expansion of a netural plasma in an external magnetic field.
Zhur. tekh. fiz. 34 no.7:1170-1174 Jl '64 (MIRA 17:8)

RUTOV, D. G., ALEKSEYEV, P. A.

"The Storage Conditions and Weight Loss of Frozen Meat in Jacketed Cold Storage Rooms."

Report submitted for the 10th Intl. Refrigeration Congress, Copenhagen, 19 August - 2 September 1959.

Rotov, B. G.

(Scientific Research Institute of the Refrigerating Industry, Moscow): "Calculation of the Time of Cooling of Food Products" /English - 6 pages/

report presented at the International Inst. of Refrigeration (IIR), Annual Meetings of Commissions 3,4, and 5, Moscow, 3-6 Sep 1958.

RUTOV, D.G., prof. (Moscow)

Application of refrigeration for preserving foods, and its influence on the nutritive value and organoleptic properties of foods. Acta chimica Hung 23 no.1/4:327-338 '60.

(EEAI 10:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut kholodil'noy promyshlennosti, Moskva, SSSR.

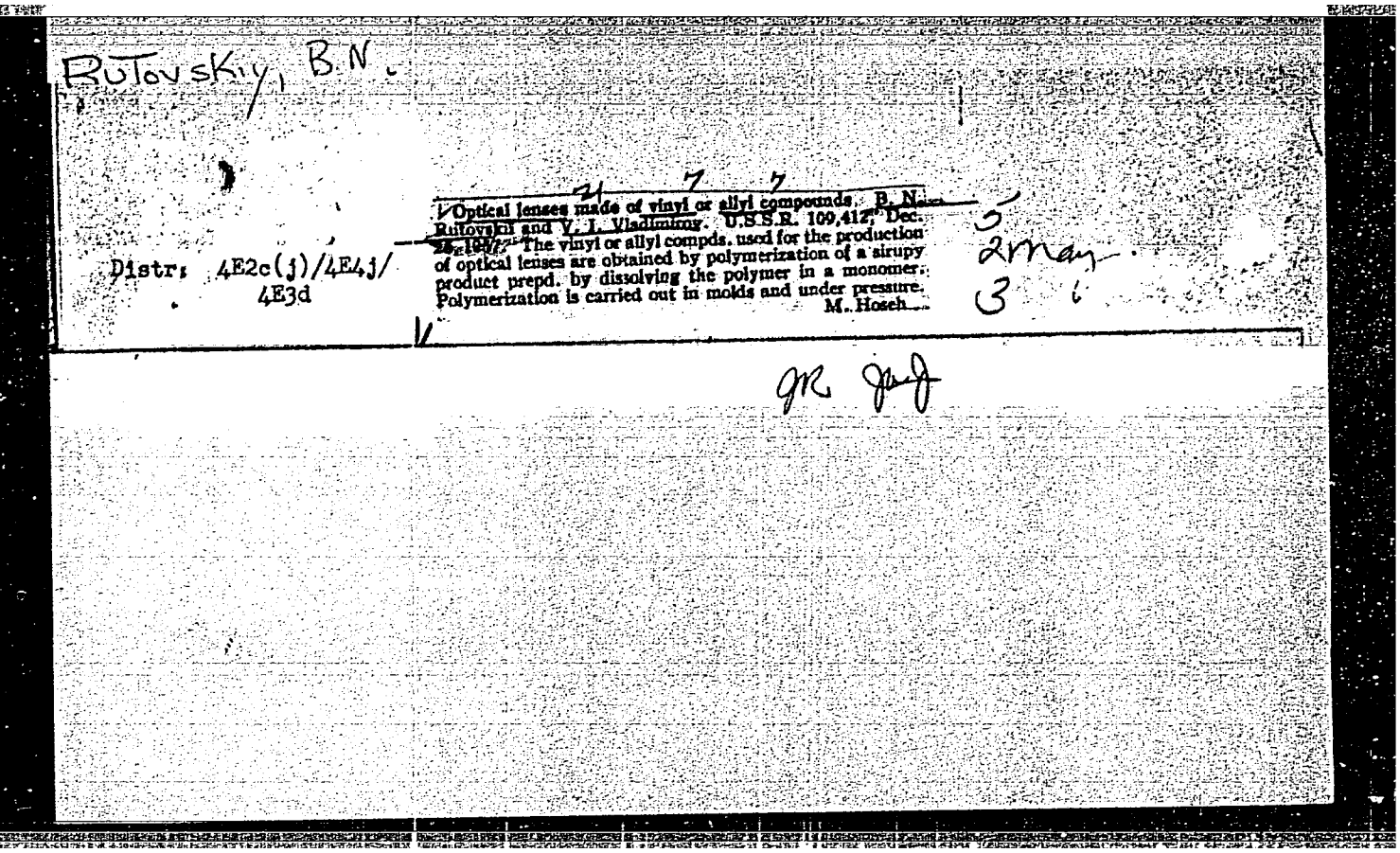
(Foods) (Enzymes)

RUTOV M.

ANASTASOV, K., Mladshi nauchen sutrudnik; RUTOV, M., ref.-rukov. pri MNZSG; GOSPODINOV, G., aspirant

Dental care in teeth extraction. Stomatologiia, Sofia no.4:220-225 1954.

(TEETH EXTRACTION,
postextraction care)



RUTOVSKIY, B.N.

Distr: 4E2c(j)/4E4j/ 4E3d

Optical lenses made of vinyl or allyl compounds. B. N. Rutovskii and V. I. Vladimirov. U.S.S.R. 109,417, Dec. 25, 1957. The vinyl or allyl compds. used for the production of optical lenses are obtained by polymerization of a sirupy product prepd. by dissolving the polymer in a monomer. Polymerization is carried out in molds and under pressure. M. Hoseh

RUTOVSKIY, M.V., kand.tekhn.; POPOV, Yu.A, prof.

Calculating the frequency of discharges in electric ignition systems. Trudy MAI no.145:60-77 '62. (MIRA 15:9)
(Airplanes--Engines--Starting devices)

LATYSHEV, L.A., kand.tekhn.nauk; RUTOVSKIY, N.B., kand.tekhn.nauk

New techniques for measuring rapidly changing temperatures in the working part of internal combustion engines. Trudy MAI no.95:5-76 '58. (MIRA 11:5)

(Gas and oil engines--Testing) (Thermometry)

S/535/60/000/119/006/009
E191/E481

AUTHORS: Latyshev, L.A., Candidate of Technical Sciences, Rutovskiy, N.B., Candidate of Technical Sciences and Tikhonov, V.B., Candidate of Technical Sciences

TITLE: Experimental investigation of the effect of pipe line vibrations on the parameters of the liquid flowing inside

PERIODICAL: Moscow. Aviatsionnyy institut. Trudy, No.119, 1960. Rabochiye protsessy v teplovykh dvigatel'nykh ustanovkakh, pp.111-123

TEXT: Referring to G.W.Housner (Ref.2: Bending vibration of a pipe line containing flowing fluids, Journal for Applied Mechanics, 1952, Vol.19, No.2) the equation of motion in a vibrating tube with fluid is recited. He found that both internal and external forces significantly affect the parameters of the liquid flowing in a vibrating pipe line and that the pipe line can become dynamically unstable at large rates of flow. Neither Housman nor later American investigators have treated the effect of mechanical factors on the hydrodynamics of fluid flow inside the vibrating tube. A system of equations is added describing the non-

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Experimental investigation of ...

stationary motion of the fluid in the tube. Friction is ignored having regard to the relatively short pipe lines in aircraft power systems. In view of mathematical difficulties, a vibration test rig was built with forcing frequencies of 25, 50, 75, 100, 125 and 175 cps, which are the resonance frequencies of cantilever springs. The range of liquid flow was between 1 and 4 m/sec. The vibrating tube which may be straight or coiled is connected by two hose lengths to the hydraulic circuit, wherein the feeding and collecting tanks both have free liquid surfaces so that the pipe vibrations are not overshadowed by hydraulic circuit vibrations. The general level of pressure is maintained by compressed air. The vibrations are induced by an electromagnetic system. The pressure is measured with a capacitive pressure transmitter. The fluid flow, the vibration frequency, the vibration amplitude and the fluctuations in the fluid pressure and its rate of flow were continuously recorded during the experiments. Several results of these tests are plotted and discussed. The work is stated to be proceeding and the numerical results described must be regarded as significantly affected by the mechanical features of the installation rather than possessing a general validity. The only

Experimental investigation of ...

general feature shown up is the unquestionable major degree of interaction between the fluid flow and the physical vibration of the pipe line. For example, the vibration of the pipe has a substantial effect on the liquid mass flow. Conversely the rate of flow has a substantial effect on the vibration amplitude, other things being equal. Sh.L.Zlotnik and V.S.Ushakov are mentioned in the paper. There are 9 figures and 8 references: 4 Soviet and 4 non-Soviet. The four references to English language publications read as follows: Housner G.W., Journal for Appl. Mechanics, 1952, Vol.19, No.2; Niordson F.J.H., Transactions of the Roy.Inst. of Technology, Stockholm U.D.C. 534, 131, 2,1953, No.73; Handelman G.H., Quarterly of Appl. Mathematic, 1955, Vol.XIII, No.3; Long R.H. Jr., J. for Appl. Mechanics, 1955, Vol.22, No.1.

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RUTOVSKIY, N.B.

PHASE I BOOK EXPLOITATION 1119

Moscow. Aviatsionnyy institut imeni Sergo Ordzhonikidze

Voprosy rabochikh protsessov teplovykh mashin; sbornik statey (Problems in the Operation of Heat Engines; Collection of Articles) Moscow, Oborongiz, 1958. 117 p. (Series: Its: Trudy, vyp. 95) No. of copies printed not given.

Ed. (Title page): Kvasnikov, A.V., Professor; Ed. (Inside book): Peshkin, M.A., Candidate of Technical Sciences; Ed. of Publishing House: Anikina, M.S.; Tech. Ed.: Zudakin, I.M.; Managing Ed.: Zaymovskaya, A.S., Engineer.

PURPOSE: This compilation is intended for engineers and technicians concerned with the design and study of complete heat engines and hydraulic machines and of their components. The data given may be used by experimental and computing groups of scientific research institutes and of special-design offices (OKB).

COVERAGE: This collection contains three reports on problems connected with modern heat engines and hydraulic machines. The papers have been excerpted (and revised for publication) from several reports prepared in the Department of Aircraft Engine Theory of the Moscow Aviation Institute from 1948 -

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1955. The scientific supervisors were Professor A.V.Kvasnikov and Docent D.I.Agubov. The first paper describes the development of a new method for measuring rapidly changing, pulsating temperatures as in the case of internal-combustion engines, particularly in high-speed machines with poor pressure-indicator accuracy. The method proposed by the authors uses a pickup with obviously high thermal inertia which inaccurately records temperature with respect to time. The second paper investigates the discharge of a gas from nozzles in the turbo-compressors of compound engines, answering two main questions: a) The deflection of the flow in an oblique cross section of single nozzles and narrowly-spaced nozzle lattices for supercritical conditions; b) the critical flow regime in two-dimensional nozzle lattices. The third paper discusses the problem of simulating the operating conditions of powerful turbo-machines by maintaining the original shape and replacing the full-scale working parts by others with only a part of the original power. The report also presents experimental data which confirm the validity of the method.

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RUTOVSKIY, U.

"Combating interference, Zarva, Birstyn."

So. Radio, Vol. 3, p. 49, 1952

ACCESSION NR: AT4041479 S/2535/64/000/157/0005/0016

AUTHOR: Gorbunov, G. M. (Candidate of technical sciences, Docent); Lepeshinskiy, I. A.; Rutovskiy, V. B. (Candidate of technical sciences)

TITLE: Position of the combustion zone in the initial section of a flame tube in the combustion chamber of an aviation gas turbine

SOURCE: Moscow. Aviatsionny*y institut. Trudy*, no. 157, 1964. Issledovaniya rabochego protsessa v kamerakh sgoraniya gazoturbinny*kh dvigately (Studying the working process of gas turbine engine combustion chambers), 5-16

TOPIC TAGS: aviation turbine, jet aircraft, combustion chamber, combustion instability

ABSTRACT: Previous experiments have shown that it is possible to set up regimes in which the combustion zone is located at the wall of the combustion chamber rather than in the central section as in conventional regimes. Such a regime was studied in chambers with and without vaned inserts by obtaining profiles of the temperatures, liquid and vaporized fuel concentrations, and flow velocities. It was found that

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in this regime, combustion of the annular air layer containing fuel vapors and droplets starts from the outer surface of the layer which is not adjacent to the recirculation zone. This situation appears to be favorable for obtaining improved temperature profiles at the chamber outlet. The flow resistance is also lower, since secondary air jets do not have to penetrate into the axial combustion region as is the case with a conventional location of the combustion zone. However, a tendency to oscillatory burning was observed. Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 00	ATD PRESS: 3057	ENCL: 00
SUB CODE: PR	NO REF SOV: 003	OTHER: 000

Card 2/2

ZARLOCH, [illegible]

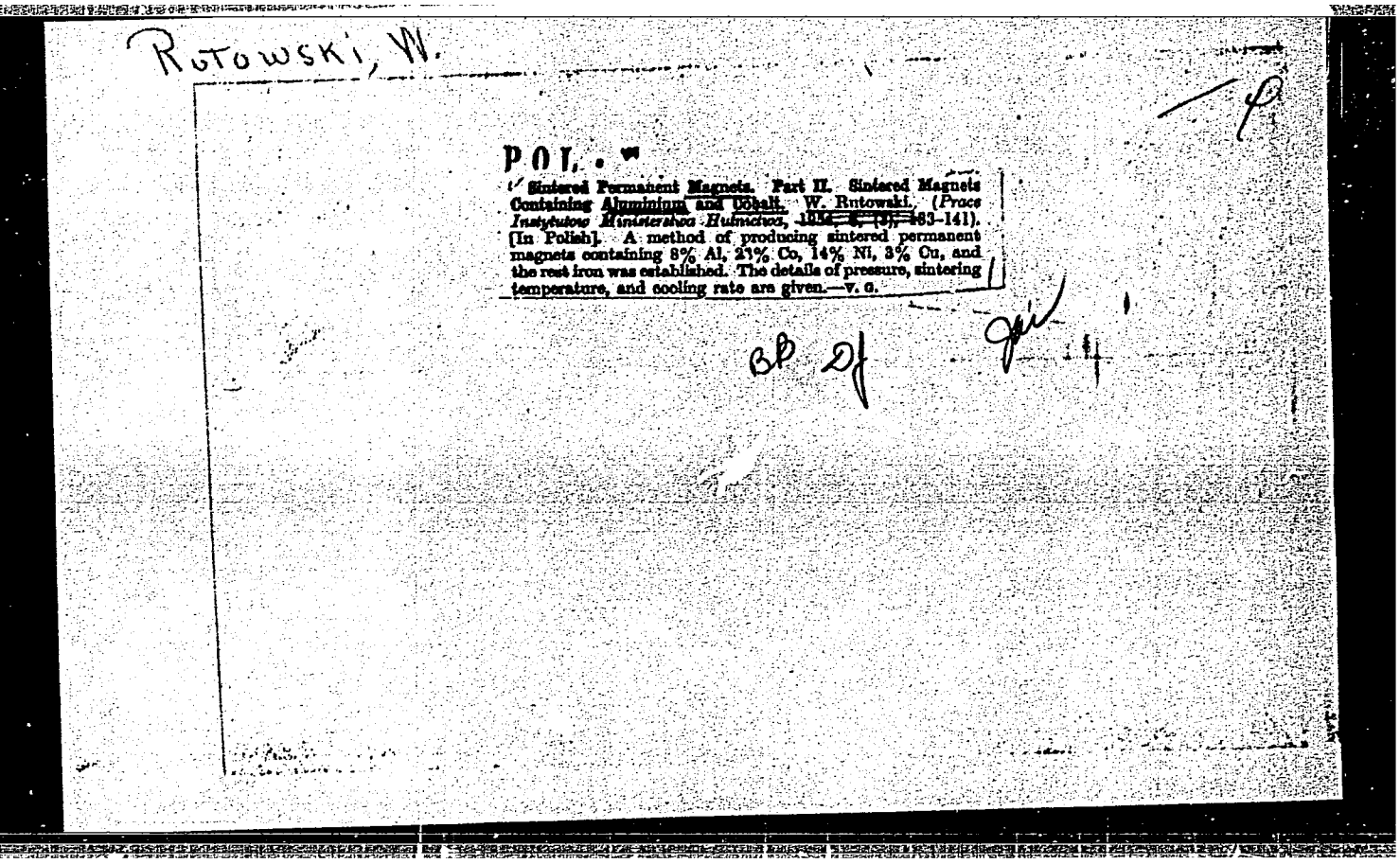
Frequency of appearance of staphylococcal alfa-antitoxin in human serum. Nauki matem.-przyr. Lodz no.16:3-9 '64.

1. Department of Microbiology, University, Lodz.

MROZOWSKI, Mieczyslaw; KOZUBSKI, Franciszek; RUTOWSKI, Tadeusz

The necessary geologic research for planning new hard coal mines.
Przegl geol 9 no.6:296-301 Je '61.

(Poland--Geology) (Poland--Coal mines and mining)



RUTOWSKI, W.

POL.

Sintered Permanent Magnets. Part II. Sintered Magnets Containing Aluminium and Cobalt. W. Rutowski. (*Prace Instytutow Ministerstwa Hutnictwa*, 1954, 6, (3), 483-141). [In Polish]. A method of producing sintered permanent magnets containing 8% Al, 21% Co, 14% Ni, 3% Cu, and the rest iron was established. The details of pressure, sintering temperature, and cooling rate are given.—V. G.

BP 2f

[illegible] Kl, W.

[illegible] methods of chemical examination or electrolysis in the production of silver powder. Hutnik. p. 9

[illegible] vol. 21, no. 3, Mar. 1954

Poland

So. [illegible] vol. , no. 10 Oct. 1954

RUTSAY, S.V.

Mechanism of the central action of hypertensin and pituitrin. Biul. eksp. biol. i med. 54 no.8:34-37 Ag '62. (MIRA 17:11)

1. Iz laboratorii fiziologii i patofiziologii serdechnoy deyatel'nosti (zav. - deystvitel'nyy chlen AMN SSSR prof. V.V. Parin) Instituta normal'noy i patologicheskoy fiziologii (dir. - deystvitel'nyy chlen AMN SSSR prof. V.V. Parin) AMN SSSR, Moskva.