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Some Inequalities for Differentiable Functions of Many Variables

$$(7)\,I_2=\left[\int\limits_{(D_m)}\cdots\int\left(\int\limits_{(D_m)}\cdots\int\frac{\left|\frac{\partial^k f(X_m)}{\partial x_{i_1}\cdots\partial x_{i_k}}-\frac{\partial^k f(Y_m)}{\partial x_{i_1}\cdots\partial x_{i_k}}\right|^q}{|X-Y|^{m+\beta q}}\,dY_m\right)dX_m\right]^{1/q}\leqslant$$

$$\leqslant C_9\left(\Delta h^{m/q-n/p-k-\beta}+\mathfrak{M}h^{\mathcal{E}_m-k-\beta}\right).$$

In (6) and (7), h is an arbitrary positive number $\leqslant \mathcal{H}$; C_i are constants not depending on A, M, h, E, ν, μ.
For additional assumptions on D all results can be extended to functions

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Some Inequalities for Differentiable Functions of Many Variables

having generalized derivatives in the sense of S.L.Sobolev.
The author mentions S.M.Nikol'skiy and L.N.Slobodetskiy. There are 4 Soviet references.

ASSOCIATION: Leningradskoye otdeleniye matematicheskogo instituta imeni V.A.Steklova Akademii nauk SSSR. (Leningrad Branch of the Mathematical Institute imeni V.A.Steklov of the Academy of Sciences USSR)

PRESENTED: June 17, 1960, by S.L.Sobolev, Academician

SUBMITTED: June 14, 1960

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AUTHOR: Il'in, V. P.

TITLE: Some integral inequalities and their applications in the theory of differentiable functions of several variables.

PERIODICAL: Matematicheskiy sbornik, v. 54, no. 3, 1961, 331-380

TEXT: The paper gives a detailed description of the formerly announced results of the author (Ref. 12: Nekotoryye integral'nyye neravenstva dlya differentsirnyemykh funktsiy mnogikh peremennykh [Some integral inequalities for differentiable functions of several variables] DAN SSSR, t. 129, no. 6 (1959), 1214-1217; Ref. 13: Nekotoryye funktsional-'nyye neravenstva tipa teorem vlozheniya sveson [Some functional inequalities of the type of embedding theorems with weight] DAN SSSR, t. 129, no. 5 (1959), 983-985). The results overlap partially with V. P. Glushko (Ref. 14: Ob operatorakh tipa potentsiala i nekotorykh teoremakh vlozheniya [On operators of the potential type and some embedding theorems] DAN SSSR, t. 126, no. 3,(1959), 467-470).
The author considers generalisations of well-known integral inequalities of the Hilbert inequality type (especially one of a two-parameter inequality of Hardy and Littlewood (Ref. 2: Some properties of fractional integrals. I, Math. Zeitschrift, 27, no. 4 (1928), 565-606)), on

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the higher dimensional case as well as their use in functions of several variables.

Let E_n be the Euclidean space of $X=X_n=(x_1,\ldots,x_n)$ and E_m the space of $Y=Y_m=(y_1,\ldots,y_m)$; $1\leq m\leq n$. If the coordinates of X are divided into two groups, then it will be written $X_n=(X_k,X_{n-k})$, where $X_k=(x_1,\ldots,x_k)$, $X_{n-k}=(x_{k+1},\ldots,x_n)$.

Let $Z=Z_n=(z_1,\ldots,z_n)$ be a point of E_n. We define: $X_n-Z_n=(x_1-z_1,\ldots x_n-z_n)$; $Y_m-Z_n=(Y_m-Z_m,Z_{n-m})=(y_1-z_1,\ldots,y_m-z_m,-z_{m+1},\ldots,-z_n)$;

$$r_1=|X_n-Z_n|=\sqrt{\sum_{i=1}^{n}(x_i-z_i)^2},\quad r_2=|Y_m-Z_n|,\quad r=|X_n-Y_m|.$$

Let $D=D(X)$ be a measurable set in E_n, $f(X)=f(x_1,\ldots,x_n)$ a function, measurable in D such that $|f(X)|^p$, $p\geq 1$, is summable; then is

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$f \in L_p^{(n)}(D)$ and $\| f \|_{L_p^{(n)}(D)} = \left[\int^{(n\text{-times})}_{(D)} \cdots \int |f|^p \, dX \right]^{1/p}$, $dX = dx_1 \ldots dx_n$.

$f \in L_\infty^{(n)}$ is defined as usual. If $D = E_n$, then $f \in L_p(E_n)$ or $f \in L_p^{(n)}$ is written instead of $f \in L_p^{(n)}(E_n)$. Let $D(X,Y)$ be a measurable set in $E_n \times E_m$. $D_y(X)$ be the section of $D(X,Y)$ at a fixed Y; $D(Y)$ being the projection of $D(X,Y)$ on E_m, and $D(X)$ the projection of $D(X,Y)$ on E_n. Let $\sigma(X,Y)$ be a non-negative measurable function in $D(X,Y)$ and $f(X)$ measurable in $D(X)$.
Let

$$\| f\sigma \|_{L_{p,}^{(n),(m)}} = \sup_{Y \in D(Y)} \left[\int^{n}_{(D_y(X))} \cdots \int |f\sigma|^p \, dX \right]^{1/p}$$

if the right hand is finite. In that case be

$f\sigma \in L_{p,\infty}^{(n),(m)}(D(X,Y))$ and if $D(X,Y) = E_n \times E_m$, then $f\sigma \in L_{p,}^{(n),(m)}$

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Some integral inequalities ...

For $p \geq 1$ let p' be defined by $\frac{1}{p} + \frac{1}{p'} = 1$; for $p = \infty$, $q = 1$ and q' be defined by $\frac{1}{q} + \frac{1}{q'} = 1$, let $\frac{p}{q'} = 1$.

§ 1 Some integral inequalities of the Hilbert inequality type. Five thecrems, generalising the above mentioned inequality from [2] in different directions, are proved by aid of four lemmata e. g.

Theorem 1.1:

Let $p \geq 1$, $q \geq 1$, $\frac{1}{p} + \frac{1}{q} \geq 1$, $1 \leq m \leq n$, $\beta < \frac{m}{q}$, $f(X_n) \in L_p(E_n)$, $g(Y_m) \in L_q(E_m)$, $Z_n = (z_1, \ldots, z_n)$, z_1 being fixed numbers. Further:

1.) $K_1 = K_1(X_n - Z_n, Y_m - Z_n) = \begin{cases} r_1^{-\alpha} r_2^{-\beta} r^{\alpha+\beta-(\frac{n}{p}+\frac{m}{q})} & \text{for } r_2 \leq r_1 \\ 0 & \text{for } r_2 > r_1 \end{cases}$

where $\alpha > -\beta$ and for $p > 1$, $\frac{1}{p} + \frac{1}{q} > 1$ holds $\alpha + \beta \geq 0$

(for $p = q = 1$: $\beta \leq 0$, $\alpha \geq -\beta$);

2.) $K_1' = K_1 r^{\frac{n}{p}+\frac{m}{q}-\lambda}$, where $\lambda < \frac{n}{p'} + \frac{m}{q'}$, $\alpha > -\beta$

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(for $q = 1 : \beta \leq 0$); $h > 0$.

Then:

$$I_1 = \overbrace{\int \cdots \int}^{n+m}_{(E_n \times E_m)} K_1(X_n - Z_n, Y_m - Z_n) f(X_n) g(Y_m) dX_n dY_m \leq M_1 \| f \|_{L_p^{(n)}} \cdot \| g \|_{L_q^{(m)}}$$

$$I_1' = \overbrace{\int \cdots \int}^{n+m}_{(r \leq h)} K_1'(X_n - Z_n, Y_m - Z_n) f(X_n) g(Y_m) dX_n dY_m \leq$$

$$\leq M_1' \| f \|_{L_p^{(n)}} \cdot \| g \|_{L_q^{(m)}} h^{\frac{n}{p'} + \frac{m}{q'} - \lambda} \qquad (17),(17')$$

where M_1 and M_1' are constants, depending on m, n, p, q, α, β, λ, and not depending on f, g, h.

Theorem 5.1:

1.) Let

$$p > 1,\ q > 1,\ \frac{1}{p} + \frac{1}{q} \geq 1,\ 1 \leq m < n,\ 0 \leq \alpha_0 < \frac{n}{p},$$

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$$0 < \beta < \frac{m}{q'}, \quad \gamma \frac{p}{q'} < \frac{n-m}{p'},$$

$$g(Y_m) \in L_q(E_m), \quad f(X_n)\,|X_{n-m}|^r \in L_p(E_n), \quad f(X_n) r^{-\alpha_0} \in L_{p,\infty}^{(n),(m)},$$

$$K_5 = |Y_m|^{-\beta} r^{\beta+\gamma\frac{p}{q'}-\alpha_0(1-\frac{p}{q'})-(\frac{n}{p'}+\frac{m}{q'})}.$$

Then:

$$I_5 = \int\cdots\int_{(E_n\,E_m)} K_5 f(X_n) g(Y_m)\,dX_n\,dY_m \leq$$

$$\leq M_5 \|g\|_{L_q^{(m)}} \cdot \|f|X_{n-m}|^r\|^{\frac{p}{q}}_{L_p^{(n)}} \cdot \|f r^{-\alpha_0}\|^{1-\frac{p}{q'}}_{L_{p,\infty}^{(n),(m)}}. \qquad (21)$$

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2.) Let $p > 1$, $q > 1$, $\frac{1}{p} + \frac{1}{q} > 1$, $1 < m < n$, $0 \leq \alpha_0 < \frac{n}{p}$,

$0 \leq \beta < \frac{m}{q}$, (for $q = 1$: $\beta = 0$), $\gamma \frac{p}{q} < \frac{n-m}{p}$ (for $p = 1$: $\gamma < 0$)

f and g the same as in 1.),

$h > 0, \lambda < \frac{n}{p} + \frac{m}{q}$, $K_5' = K_5 r^{\frac{n}{p}+\frac{m}{q}-\lambda}$.

Then:

$$I_5' = \overbrace{\int \cdots \int}^{n+m}_{(r<h)} K_5' f(X_n)\, g(Y_m)\, dX_n\, dY_m \leq \qquad (21')$$

$$M_5 h^{\frac{n}{p}+\frac{m}{q}-\lambda} \|g\|_{L_q'(m)} \cdot \| f |X_{n-m}|^{\gamma} \|^{\frac{p}{q}}_{L_p(n)} \cdot \| f r^{-\alpha_0} \|^{1-\frac{p}{q}}_{L_{p_1}(n),(m)}$$

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where M_5 and M_5' depend on f, g and do not depend on h.

§ 2. Some theorems on integrals of the potential type.
In this paragraph conclusions are brought in eight theorems from the theorems of § 1. e. g.
Theorem 6'. 2: If $p > 1$, $1 \leq m \leq n$ and besides

1) $$\gamma < \frac{n-m}{p'};$$

2) $$\frac{n}{p'} < \lambda + \gamma < \frac{n}{p'} + \frac{m}{p};$$

3) $$q' = \frac{m}{\lambda + \gamma - \frac{n}{p'}}$$

4) $$|X_{n-m}|^{\gamma} f(X_n) \in L_p(E_n).$$

then

$$U(Y_m) = \int\limits_{(E_n)} \cdots \int \frac{f(X_n)}{(X_n - Y_m)^{\lambda}} dX_n \quad L_{q'}(E_m),$$

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while $$\| U \|_{L_{q'}(E_m)} \leq M_6 \| f | X_{n-m}|^{\gamma} \|_{L_p(E_n)}, \qquad (29)$$

holds, where M_6 is independant from f.

§ 3. Auxiliary inequalities.

§ 4. Some inequalities for differentiable functions of several variables.

Let f(X) be a continuous function which is defined in the domain D of the n-dimensional space, possessing continuous derivatives in the interior of D, D having the following property: To every point P of D one may be able to construct a sector of the n-dimensional sphere of constant radius and shape, the top of which lies at P, and which is entirely included in D. The class of such domains is called $C_{\mathfrak{R}}^{n}$, $\mathfrak{R}$ being the maximal allowed radius of the sector.

Let $$D^j f = \sqrt{\sum_{i_1,\ldots,i_j=1}^{n} \left| \frac{\partial^j f}{\partial x_{i_1} \ldots \partial x_{i_j}} \right|^2} .$$

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Eight theorems are proved e. g.
Theorem 5.4
Let $1 \leqslant m < n$, E_m — m - dimensional hyper-plane in E_n. Further be

$$p \leqslant 1,\ \gamma < \frac{n-m}{p'} \text{ (for } p = 1 : \gamma \leqslant 0),\ 1-\kappa \geqslant 1,$$

$$1 - k - \gamma > \frac{n-m}{p}$$

$$D \in C^n_{\alpha},\ f(X) \in L^{(n)}_{\gamma}(D),\ D^{\alpha} f \cdot \varrho^{\nu} L^{(n)}_{p}(D),$$

where ϱ is the distance of $X \in D$ from E_m and q, δ are such that

1.) $1 \leqslant (\gamma, p) \leqslant q < \infty$, $\frac{m}{q} > \frac{n}{p} - (1-k) + \gamma$,

while for $p > 1$ and $1-k-\gamma < \frac{n}{p}$ it is $\frac{m}{q} \geqslant \frac{n}{p} - (1-k) + \gamma$.

2.) a) if $1 - k - \gamma \geqslant \frac{n}{p}$, then $0 \leqslant \beta < \frac{m}{q}$ (for $q = \infty$: $\beta = 0$)

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b) if $1 - k - \gamma < \frac{n}{p}$, then $0 \leq \beta < \frac{m}{q} - \frac{n}{p} + 1 - k - \gamma$

and for $p > 1$ it is $0 \leq \beta \leq \frac{m}{q} - \frac{n}{p} + 1 - k - \gamma$.

D_m be the section of D through E_m, r_2 -- the distance of the variable point $Y \in D_m$ to an arbitrary fixed point of D.
Then holds the following inequality:

$$\left\| D^k f \cdot r_2^{-\beta} \right\|_{L_q(D_m)} \leq K_{10} \left\| f \right\|_{L^{(n)}(D)} h^{\frac{m}{q} - \frac{n}{p} - k - \beta} +$$

$$+ K_{11} \left\| D^1 f \cdot \rho^{\gamma} \right\|_{L_p^{(n)}(D)} h^{\frac{m}{q} - \frac{n}{p} + 1 - k - \gamma - \beta}, \qquad (45)$$

where h is an arbitrary positive number, not exceeding k, and k_{10},

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k_{11} constants, not depending on f and h.

Theorem 6.4
Let $1 \leq p < \infty$, $0 \leq \alpha_0 < \frac{n}{p}$, $-\frac{n}{p} < \alpha < \frac{n}{p}$, $1 - k \leq 1$.

Let $D \in C^n_{\mathcal{M}}$, Z a fixed point of D, $f(X) \in L_p(D)$,

$\nu \geq 1$, $r_1^{\alpha} D^l f \in L_p(D)$, $r^{-\alpha_0} D^l f \in L^{(n),(m)}_{p,\infty}(D,D)$;

the numbers m, q, β satisfy the following conditions:

1) $1 \leq m \leq n$, $m > -\alpha p$;

2) $\max(\nu, p) \leq q \leq \infty$;

3) $\frac{n}{p} - (1 - k) - \alpha_0 < \frac{m - \alpha_0 p}{q}$;

4)a) if $\frac{n}{p} - (1 - k) - \alpha_0 (1 - \frac{p}{q}) + \alpha \frac{p}{q} \leq 0$, then

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$$-\alpha\frac{p}{q} \le \beta < \frac{m}{q} \quad (\text{for } q = \infty : \ \beta = 0)$$

b) if $\frac{n}{p} - (1-k) - \alpha_0\left(1-\frac{p}{q}\right) + \alpha\frac{p}{q} > 0$, then

$$-\alpha\frac{p}{q} \le \beta \le \frac{m}{q} + 1 - k + \alpha_0\left(1-\frac{p}{q}\right) - \frac{n}{p} - \alpha\frac{p}{q}.$$

Let S_m be a bounded domain in the intersection D_m of D with an n-dimensional hyperplane. Then the following inequality holds:

$$\| D^k f \cdot r_2^{-\beta} \|_{L_q^{(m)}(S_m)} \le K_{12} \| D^l f \cdot r_1^{\alpha} \|_{L_p^{(n)}(D)}^{\frac{p}{q}} \| D^l f \cdot r^{-\alpha_0} \|_{L_{p_1}^{(n),(m)}(D,D_m)}^{1-\frac{p}{q}} h^{\varepsilon} +$$

$$+ K_{13} \| f \|_{L_\nu^{(n)}(D)} h^{\frac{m}{q} - \frac{n}{\nu} - k} \cdot \begin{cases} h^{-\beta} & \text{for } \beta > 0, \\ d^{-\beta} & \text{for } \beta < 0, \end{cases} \qquad (47)$$

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where $\varepsilon = \frac{m}{n} + \alpha_0 \left(1 - \frac{p}{q}\right) + 1 - k\frac{n}{p} - \frac{p}{q} - \beta$,

$d = \sup_{Y \in S_m} r_2$, $0 < n \leq \varkappa$, K_{12} and K_{13} not depending on f, h, d.

The author mentions: Kh. L. Smolitskiy.

There are 9 Soviet-bloc and 5 non-Soviet-bloc references. The three references to English-language publications read as follows: G. H. Hardy, J. E. Littlewood, G. Polia, Neravenstva [Inequalities], Moskva, SSL, (1948); G. H. Hardy, J. E. Littlewood, Some properties of fractional integrals. I. Math. Zeitschr., 27, no.4, (1928), 565-606; L. Nirenberg, Estimates and existence of solutions of elliptic equations, Comm. pure and appl. Math., 9, no.3, (1956), 509 - 530.

SUBMITTED: July 4, 1959

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D299/D301

16.4100

AUTHOR: Il'in, V. P.

TITLE: On the approximation of functions of the spaces $\tilde{W}_p^{(l)}(D)$ and $W_p^{(l)}(D)$ by continuously differentiable functions

SOURCE: Akademiya nauk SSSR. Matematicheskiy institut. Trudy. v. 64. 1961, 61-78

TEXT: Sufficient conditions are given with respect to the region D of the n-dimensional Euclidean space E_n, under which the functions f, belonging to Sobolev's spaces $\tilde{W}$ and W, can be approximated by continuously differentiable functions. The space $\tilde{W}_p^{(l)}(D)$ is defined as the totality of functions $f(X)$ $(X = x_1, \ldots x_n))$ on D which have generalized derivatives (in the sense of S. L. Sobolev) of order $l = [l]$ ([l] denoting the integral part of l), satisfying the conditions:

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On the approximation ...

$$\|f\|_{L_p(B)} = \left[\int\cdots\int_{(B)} |f(X)|^p \, dX\right]^{\frac{1}{p}} < \infty, \tag{1}$$

$$|f|_{L_p^{(l)}(B)} = \sum_{i_1,\ldots,i_l=1}^{n} \left[\int\cdots\int_{(B)} \left|\frac{\partial^l f(X)}{\partial x_{i_1}\cdots\partial x_{i_l}}\right|^p dX\right]^{\frac{1}{p}} < \infty, \tag{2}$$

if l is an integer, and

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On the approximation ...

$$\|f\|_{L_p^{(l)}(D)} = \sum_{i_1,\ldots,i_l=1}^{n} \left\{ \int\cdots\int_{(D)} \left[\int\cdots\int_{(D)} \left| \frac{\partial^l f(X)}{\partial x_{i_1}\ldots\partial x_{i_l}} - \frac{\partial^l f(Y)}{\partial x_{i_1}\ldots\partial x_{i_l}} \right|^p \cdot \frac{dY}{|X-Y|^{n+(s-l)p}} \right] dX \right\}^{\frac{1}{p}} < \infty, \qquad (2')$$

if l is not an integer; (l is a non-negative number, $p \geq 1$). The space $\widetilde{W}$ is linear and normalized. A subclass of functions is singled out from the class of functions, belonging to $\widetilde{W}$; namely those functions which have, in D, all possible generalized derivatives to l-th order inclusive, belonging to $L_p(D)$. This subclass is denoted by $W_p^{(l)}(D)$. The problem is considered of approximating the functions $f \in \widetilde{W}$ and $F \in W$, by a sequence of functions $\varphi_\nu(X)$ ($\nu = 1, 2, \ldots$), belonging to $C^{(l)}(\bar{D})$, where $\bar{D} = D + \Gamma$ (Γ being the boundary of D).

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On the approximation ...

If $D = E_n$, such an approximation can be effected with any degree of accuracy. If, however, D is not identical with the entire space E_n, the approximation is not always possible. In the references it was shown that for functions, belonging to $\widetilde{W}$, the approximation is possible if D is a bounded region which is starlike with respect to an interior point. In the present work, other sufficient conditions for D are found, under which the approximation is possible. In particular, the conditions are given, under which the spaces $\widetilde{W}$ and W coincide. Several lemmas are proved which lead to 3 fundamental theorems. The most important of these, is Theorem 2: Let l be a non-negative number, $p \geqslant 1$, and D a region of E_n, satisfying the conditions: a) D has the property $A(N,\rho)$ (which means that 2 finite systems of n-dimensional regions S_N exist, each of which covers D); b) D belongs to $C(H, \sigma)$ if l is an integer, and to $C(H,\sigma, K, \lambda)$, if l is not an integer; $(C(H,\sigma)$ means that D contains an n-dimensional spherical sector with vertex X, radius H and solid

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angle σ, for every $X \in D$; $C(H, \sigma, K, \lambda)$ implies a similar condition with respect to 2 points X and Y). Then: 1) the spaces $\widetilde{W}_p^{(1)}(D)$ and $W_p^{(1)}(D)$ coincide; 2) for each function $f \in \widetilde{W}$, there exists a sequence of functions $\psi_\nu(X)$ which have continuous derivatives of any order in E_n, so that

$$\lim_{\nu \to \infty} \| f - \psi_\nu \|_{W_p^{(1)}(D)} = 0.$$

In conclusion, an example is given (taken from the references) which shows that the above approximation is not always possible (as condition $A(N, \mathcal{K})$ was not satisfied). There are 9 references: 8 Soviet-bloc and 1 non-Soviet-bloc.

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16.3400

AUTHORS: Il'in, V. P., Solonnikov, V. A.

TITLE: Some Properties of Differentiable Functions of Many Variables

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 3, pp. 538-541

TEXT: The authors consider functions which possess various differential properties in several variables (see (Ref.1-4)).

Let $f(x_1, \ldots, x_n)$ be a smooth function; $h>0$, $\alpha_i > 0$ $(i=1,2,\ldots,n)$ arbitrary constants; ν_i, l_i, s_i, k_i arbitrary nonnegative integers, $0 \leq \nu_i \leq l_i$. It holds the identity:

$$D_{x_1}^{\nu_1} D_{x_2}^{\nu_2} \ldots D_{x_n}^{\nu_n} f(x) = \frac{C}{h} \int_0^{h^{\alpha_1}} \ldots \int_0^{h^{\alpha_n}} f(x_1 + y_1, \ldots, x_n + y_n) \times$$

$$\times \prod_{i=1}^{n} \frac{\partial^{l_i}}{\partial y_i^{l_i}} \left[\frac{y_i^{l_i - \nu_i - 1}}{(l_i - \nu_i - 1)!} \psi_i(y_i, h^{s_i}) \right] dy_1 \ldots dy_n -$$

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Some Properties of Differentiable Functions of Many Variables

$$-C\sum_{l=1}^{n} x_l \int_0^A \frac{dv}{v^{\lambda+r}} \int_0^{v^{x_1}} \cdots \int_0^{v^{x_n}} \prod_{l=1}^{n} \frac{\partial^{\gamma_l}}{\partial y_l^{\gamma_l}} \left[\frac{y_l^{\gamma_l-r-1}}{(\gamma_l-r-1)!} \psi_l(y_l, v^{x_l}) \right] dy_1 \ldots dy_n \times$$

$$\times \int_0^{v^{x_1}-y_1} \left[D_1^{\gamma_1} f(x_1+y_1, \ldots, x_1+y_1+t_1, \ldots, x_n+y_n) - \right.$$

$$- 2D_1^{\gamma_1} f(x_1+y_1, \ldots, x_1+y_1+\tfrac{1}{2}t_1, \ldots, x_n+y_n) +$$

$$\left. + D_1^{\gamma_1} f(x_1+y_1, \ldots, x_1+y_1+t_1, \ldots, x_n+y_n) \right] \gamma_{21} y_1^{\gamma_1+\gamma_2+1} (v^{x_1}-y_1-t)^{\gamma_1+\gamma_2+1} +$$

$$+ \gamma_{22} y_1^{\gamma_1+\gamma_2+1} (v^{x_1}-y_1-\tfrac{1}{2}t)^{\gamma_1+\gamma_2+1} \Big] dt,$$

where C, γ_{11}, γ_{21} are certain constants, $r = \sum_{l=1}^{n} \gamma_l (\gamma_1+\gamma_2+3)$,

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$$\psi_l(y_l), \quad v^{x_l} = (l_l - v_l) \int_{y_l}^{v^{x_l}} (v^{x_l} - t)^{\gamma_l+\gamma_1+\gamma_2+2} t^{\lambda_l+\nu_l} dt +$$

$$+ 2y_l \frac{\partial}{\partial y_l} \int_{y_l}^{v^{x_l}} (v^{x_l} - t)^{\gamma_l+\gamma_1+\gamma_2+2} t^{\lambda_l+\nu_l} dt +$$

$$+ \frac{1}{l_l - v_l - 1} y_l^2 \frac{\partial^2}{\partial y_l^2} \int_{y_l}^{v^{x_l}} (v^{x_l} - t)^{\gamma_l+\gamma_1+\gamma_2+2} t^{\lambda_l+\nu_l} dt.$$

Most of the results formulated below follow from the given identity.

Let D be a domain of the E_n with the property: In every point $y \in D$ an n-dimensional rectangle can be constructed lying entirely in D, the corner of which is in x, and the edges of which are parallel to the axes of coordinates and have the constant length $\ldots$ Moreover: If $(x_1, \ldots, x_l, \ldots, x_n)$ and $(x$

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$f \in \mathfrak{W}^{l_1 \ldots l_n}_{p_0 p_1 \ldots p_n}$ can be continued, under remaining differential properties and norm, on the entire E_n (in the sense of the norm equivalence).

Let

$$\varkappa_i \equiv \frac{1}{l_i}\left(1 - \sum_{j=1}^{n} \frac{1}{p_j l_j} + \frac{1}{p_i} \sum_{j=1}^{n} \frac{1}{l_j}\right) > 0.$$

Theorem 3: Let

$f \in \mathfrak{W}^{l_1 \ldots l_n}_{p_0 p_1 \ldots p_n}$ (D). Then it holds:

1.) If $\varepsilon_0 = 1 - \sum_{i=1}^{n} \frac{1}{p_i l_i} - \sum_{i=1}^{n} \varkappa_i \nu_i > 0$, then f(x) is equivalent to a continuous function differentiable in $\overline{D}$ and

Card 6/10

Some Properties of Differentiable Functions of Many Variables

$$\left|D^{\nu_1}_{x_1} D^{\nu_2}_{x_2} \dots D^{\nu_n}_{x_n} f\right| \leq C \left(\|f\|_{L_{p_0}(D)} h^{-\frac{1}{p_0}\sum_{i=1}^{n} \alpha_i - \sum_{i=1}^{n} \alpha_i \nu_i} + \right.$$

$$\left. + \|f\|_{L_{p_1 \dots p_n}(D)} h^{\xi_s} \right).$$

2.) If

$$\xi_s = 1 - \sum_{j=1}^{n} \frac{1}{p_j l_j} - \sum_{j=1}^{n} \alpha_j \nu_j + \frac{1}{q} \sum_{j=1}^{s} \alpha_j > 0, \quad q \geq p_i > 1$$

then

$$(i = 0, 1, \dots n)$$

$$\|D^{\nu_1}_{x_1} D^{\nu_2}_{x_2} \dots D^{\nu_n}_{x_n} f\|_{L_q(D_i)} \leq C \left(\|f\|_{L_{p_0}(D)} h^{\frac{1}{q}\sum_{j=1}^{s} \alpha_j - \frac{1}{p_0}\sum_{j=1}^{n} \alpha_j - \sum_{j=1}^{n} \alpha_j \nu_j} + \right.$$

$$\left. + \|f\|_{L_{p_1 \dots p_n}(D)} h^{\xi_s} \right).$$

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S/020/61/136/003/003/027
C 111/ C 333

Some Properties of Differentiable Functions of Many Variables

3.) If $q > p_i > 1$ $(i = 0,1,\ldots, n)$

$$1 - \sum_{j=1}^{n} \frac{1}{p_j l_j} - \sum_{j=1}^{n} \varkappa_j \nu_j + \frac{1}{q} \sum_{j=1}^{s} \varkappa_j = 0 \quad \text{then}$$

$$|D_{x_1}^{\nu_1} D_{x_2}^{\nu_2} \ldots D_{x_n}^{\nu_n} f|_{L_q(D_s)} \leq C \left(|f|_{L_{p_0}(D)} h^{\frac{1}{q} \sum_{j=1}^{n} \nu_j - \frac{1}{p_0} \sum_{j=1}^{n} \nu_j - \sum_{j=1}^{n} \nu_j \nu_j} + |f|_{L_{p_0 \ldots p_n}^{l_0 \ldots l_n}} \right)$$

$h > 0$ is an arbitrary number which satisfies the condition.

$h \leqq H \cong \min_{i=1,\ldots,n} \varkappa_i^{1/\alpha}$, D_s is the section of D by the hyperplane

$x_{s+1} = \text{const}, \ldots x_n = \text{const}.$

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C 111/ C 333

Some Properties of Differentiable Functions of Many Variables

Theorem 4 is a further embedding theorem (an analogue of the theorem in (Ref.7) for the Sobolev spaces W_p^l).

Theorem 5 says that, if D is finite, the set $\{f\}$ is bounded in the norm of

$$\mathfrak{M}^{l_1 \ldots l_n}_{p_0 p_1 \ldots p_n}(D)$$ and the condition 1) or 2) of theorem 3 is satisfied, then the set

$$\left\{ D^{\nu_1}_{x_1} \ldots D^{\nu_n}_{x_n} f \right\}$$ is compact in C or $L_q(D_s)$.

A similar statement refers to theorem 4.

Theorem 6 is a special case of part 3 of theorem 3 and theorem 4, if $D = E_n$ and $h = \infty$.

Card 9/10

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S/020/61/136/003/003/027
C 111/ C 333

Some Properties of Differentiable Functions of Many Variables

Theorem 7 is a partially special inversion of theorem 6.

There are 7 references: 6 Soviet and 1 Italian.

ASSOCIATION: Leningradskoye otdeleniye Matematicheskogo instituta imeni V. A. Steklova Akademii nauk SSSR (Leningrad Branch of the Mathematical Institute imeni V. A. Steklov of the Academy of Sciences USSR)

PRESENTED: July 28, 1960, by V. J. Smirnov, Academician

SUBMITTED: July 21, 1960

Card 10/10

IL'IN V.P.

Approximation of functions from $W_p^{(l)}(D)$ and $W_p^{(l)}(D)$ spaces by continuously differentiable functions. Dokl.AN SSSR 137 no.6:1283-1286 Ap '61. (MIRA 14:4)

1. Leningradskoye otdeleniye Matematicheskogo instituta imeni V.A. Steklova AN SSSR. Predstavleno akademikom V.I.Smirnovym.
(Functional analysis)

IL'IN, V.P.; SOLONNIKOV, V.A.

Some properties of differentiable functions of several variables.
Trudy Mat.inst. 66:205-226 '62. (MIRA 15:11)
(Functions of several variables)

IL'IN, V.P.

Properties of some classes of differentiable functions of several variables defined in an n-dimensional region. Trudy Mat.inst. 66: 227-363 '62. (MIRA 15:11)

(Functions of several variables)

IL'IN, V.P.

Inequalities between the norms of partial derivatives of functions of several variables. Dokl. AN SSSR 150 no.5:975-977 Je '63. (MIRA 16:8)

1. Leningradskoye otdeleniye Matematicheskogo instituta im. V.A. Steklova AN SSSR. Predstavleno akademikom I.M.Vinogradovym.
(Inequalities (Mathematics)) (Functions of several variables)

IL'IN, V.P.

Some inequalities between the norms of partial derivatives of functions of several variables. Dokl. AN SSSR 152 no.2:262-265 S '63. (MIRA 16:11)

1. Matematicheskiy institut im. V.A. Steklova AN SSSR.
Predstavleno akademikom I.M. Vinogradovym.

IL'IN, V.P.

Splitting of parabolic and elliptic difference equations.
Sib. mat. zhur. 6 no.6:1425-1428 N-D '65.
(MIRA 18:12)

L 28470-66 EWT(m)/EWA(d)/EWP(v)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HM

ACC NR: AP6010139 (N) SOURCE CODE: UR/0125/66/000/003/0011/0014

AUTHOR: Il'in, V. P.; Razikov, M. I.

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy politekhnicheskiy institut)

TITLE: Effect of thermal cycle of welding on the properties and phase composition of 30Kh10G10 chromium-manganese steel

SOURCE: Avtomaticheskaya svarka, no. 3, 1966, 11-14

TOPIC TAGS: austenitic steel, chromium steel, manganese steel, arc welding, thermal effect, cooling rate, phase composition / / 30Kh10G10 austenitic steel

ABSTRACT: 30Kh10G10 austenitic metastable chromium-manganese steel is highly cavitation-resistant and finds application as a protective coating for low-carbon and low-alloy metal of the parts of hydraulic machinery and water turbines. When heated above 600°C, however, its structure becomes unstable, which affects its mechanical properties. Hence it was of interest to investigate the thermal effect of welding cycle on the phase composition and mechanical properties of the metal in the zone affected by the welding heat. Specimens of this steel were tested under conditions simulating the effect of the thermal cycle of single-pass arc welding; the maximum

Card 1/2 UDC: 621.791.01:669.140.56.046

ACC NR: AP6010139

temperature was 1350-1400°C and the cooling rate varied within the limits of from 600 to 0.15°C per sec in the 750-650°C range. In this case the time of stay of specimens of this steel (3-5 mm thick sheets) in the dangerous temperature range (800-600°C) is determined by their cooling rate. The lower the cooling rate is, the greater the effect of the thermal cycle on the mechanical properties and phase composition of the metal. Findings: at a cooling rate of less than 1°C/sec the impact strength of the specimens drops sharply, although their ultimate strength remains almost the same whether the cooling rate is 600°C/sec or 0.15°C/sec. At cooling rates of from 600 to 40°C/sec hardness changes insignificantly and amounts to ~250 kg/mm^2, but if the cooling rate is further reduced (to 1.2°C/sec), hardness begins to increase and reaches 290 kg/mm^2, but below 1.2°C/sec it decreases again, evidently owing to the congulation and precipitation of fine-dispersed carbides. Radiographic examination showed that the decrease in the impact strength of 30Kh10G10 steel is due to both the decomposition of austenite with segregation of γ- and α-phases and the precipitation of carbides at grain boundaries with consequent embrittlement of grain boundaries. These structural transformations ($\gamma \rightarrow \epsilon \rightarrow \alpha$, with ultimate segregation of carbide phase) account for the deterioration in the plasticity and impact strength of the metal. Thus, the welding regime of 30Kh10G10 steel should be such as to assure a cooling rate of at least 1°C/sec; hence, during single-pass welding of 30Kh10G10 sheet steel (3-5 mm thick) the linear energy should not exceed 2000-2500 cal/cm, i.e. this steel should be welded at minimal current intensity and high speed. Orig. art. has: 4 figures, 3 tables.

SUB CODE: 11, 13/ / SUBM DATE: 30Nov64/ ORIG REF: 004

Card 2/2 LC

IL'IN, V.P.

Some properties of classes of differentiable functions defined in a certain region. Trudy Mat. inst. 84:93-143 '65.

Inequalities between the norms of partial derivatives of functions of several variables. Ibid.:144-173 (MIRA 18:9)

IL'IN V. S.

"The Structure and Funotional-Mechanical Properties of the Wood of Various Forms of Birch as Distinguished by Its Bark." Cand Agr Sci, Leningrad Order of Lenin Forestry Engineering Acad imeni S. M. Korov, Leningrad, 1954. (KL, No 7, Feb 55)

SO: Sum. No. 631, 26 Aug 55- Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (14)

USSR/Radio Receivers, Battery Jan 1946
Radio receivers - Measurements

"Utilization of Receiving Apparatus of Radio Centers for Two-way Group Telephone Communication," V. S. Il'yin, Engineer at the Telegraph-Telephone Section of the Mordvin Administration of the People's Commissariat of Communications, 1 p

"Vestnik Svyazi - Elektro Svyaz'" No 1 (70)

Use of CTs-6-M apparatus showed a lack of volume over long distance communication. Amplifier changes would entail too much new apparatus and an uneconomical expenditure of fuel. I. S. Rudkin developed a method by which the standard battery

1942

USSR/Radio Receivers, Battery (cont'd) Jan 1946
Radio receivers - Measurements

receivers BI-234 and RPK-9 and others could be so utilized to carry out two-way amplification of the flow of low frequencies.

1942

IL'YIN, V. S.

IL'IN, V.S.

Using the variation method for calculations of "sudden" inhomogeneities in wave guides. Izv.vys.ucheb.zav.; radiofiz. 1 no.3:88-94 '58. (MIRA 12:1)

1. Saratovskiy gosudarstvennyy universitet.
(Wave guides)

85988

S/141/60/003/004/013/019
E192/E382

9,1300 (also 1006)

AUTHOR: Il'in, V.S.

TITLE: Variation Method of Calculating the Symmetrical Quadripole Discontinuities in Rectangular Radio Waveguides

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 4, pp. 683 - 693

TEXT: The Schwinger variation method was employed by Il'in (Ref. 1) to analyse the discontinuity encountered when joining two rectangular waveguides of different heights. In the following the method is extended to the case when the waveguides are coupled by means of a grid-like diaphragm having a finite length. The system considered is shown in Fig. 1. The grid-like discontinuity has a thickness L . It is assumed that in the axis y (perpendicular to the plane of the drawing), the system is uniform and is bounded by two walls situated in the planes y = 0 and y = d . Consequently, the problem should be solved for the E-plane of the waveguide. Moreover, it is assumed that the losses in the media filling the waveguides I and II, the channels of the discontinuity

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E192/E382

Variation Method of Calculating the Symmetrical Quadripole Discontinuities in Rectangular Radio Waveguides

and the walls are negligible. The spacings b (Fig. 1) are chosen so that only the dominant waves of the type H_{0m} are propagating in the two waveguides. The electric field components E_x in the regions 1, 2, 3, ..., I and II can therefore be expressed by Eqs. (1), where the propagation constants are defined by Eqs. (2). R and T in the above equations represent the reflection and transmission coefficients with respect to the terminal planes z = 0 and z = L . By comparing the field components at z = 0 , a set of formulae represented by Eqs. (3) is obtained. A similar procedure for z = L leads to Eqs. (4). The magnetic field component H_y can be determined from Eq. (5). The comparison of the magnetic field components at z = 0 and z = L leads to a system of two integral equations which are expressed by Eqs. (6) and (7).

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Variation Method of Calculating the Symmetrical Quadripole Discontinuities in Rectangular Radio Waveguides

These can be transformed by addition and subtraction so that two different integral equations are derived; these are given by Eqs. (8). Further transformation of Eqs. (8) can be effected by introducing the notation defined by Eqs. (9). From Eqs. (3), (4) and (9), it is possible to derive Eq. (10). By multiplying Eqs. (8) by $E^{-(+)}$ and then integrating them over 0 to b and taking into account Eq. (10), the relationship between R and T can be expressed by Eqs. (11). These represent two quadratic functionals. The problem now consists of finding stationary points of the functionals given by Eqs. (11). In other words, it is necessary to solve a variation problem. The functions $E^{-(+)}$ can be represented in the form of the series given by Eqs. (12), where the coefficients a can be defined from the conditions expressed by Eqs. (13). The functions $E^{-(+)}$ can be approximately expressed by Eq. (14). Consequently, the functionals can be

Variation Method of Calculating the Symmetrical Quadripole Discontinuities in Rectangular Radio Waveguides

written in the form of Eqs. (15). It is now possible to determine the equivalent circuit of the discontinuity. This is represented by the T-type network shown in Fig. 2. The impedances of this network are expressed by:

$$Z = \frac{1 + R - T}{1 - R + T} \; ; \quad Z + 2Z_{III} = \frac{1 + R + T}{1 - R - T} \qquad (16) .$$

On the other hand, by comparing Eqs. (15) and (16) it is found that the impedances can be determined from Eqs. (17). Eqs. (11) and (15) are employed to analyse some special cases. First, the case of $L = 0$ is investigated (Fig. 3a). Other cases which can be analysed by employing the above method are illustrated by the remaining sketches in Fig. 3. It is finally pointed out that a similar method can be employed to analyse the H-plane in waveguide systems.

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E192/E382

Variation Method of Calculating the Symmetrical Quadripole Discontinuities in Rectangular Radio Waveguides

This paper was presented at the Third All Union Conference MVO SSR on Radioelectronics.
There are 3 figures and 7 Soviet references, 1 of which is translated from English.

ASSOCIATION: Saratovskiy gosudarstvennyy universitet
(Saratov State University)

SUBMITTED: March 19, 1960

Card 5/5

KALININ, V.I., prof., doktor fiziko-matem. nauk [deceased];
AKINDINOV, V.V.; GERSHTEYN, G.M.; DASHENKOV, V.M.; YEVSEYEV,
V.I.; IL'IN, V.S.; KOROSTELEV, G.N.; LUCHININ, V.D.; MAIMENKO,
Yu.P.; RYAZANOVA, T.P.; SEDIN, V.A.; TOLSTIKOV, V.A.; SHITYROV,
A.I.; AVILOV, B.I., red.; ZENIN, V.V., tekhn. red.

[Practical work in radio physics] Radiofizicheskii praktikum.
Izd.2., dop. i perer. Saratov, 1961. 277 p. (MIRA 15:1)

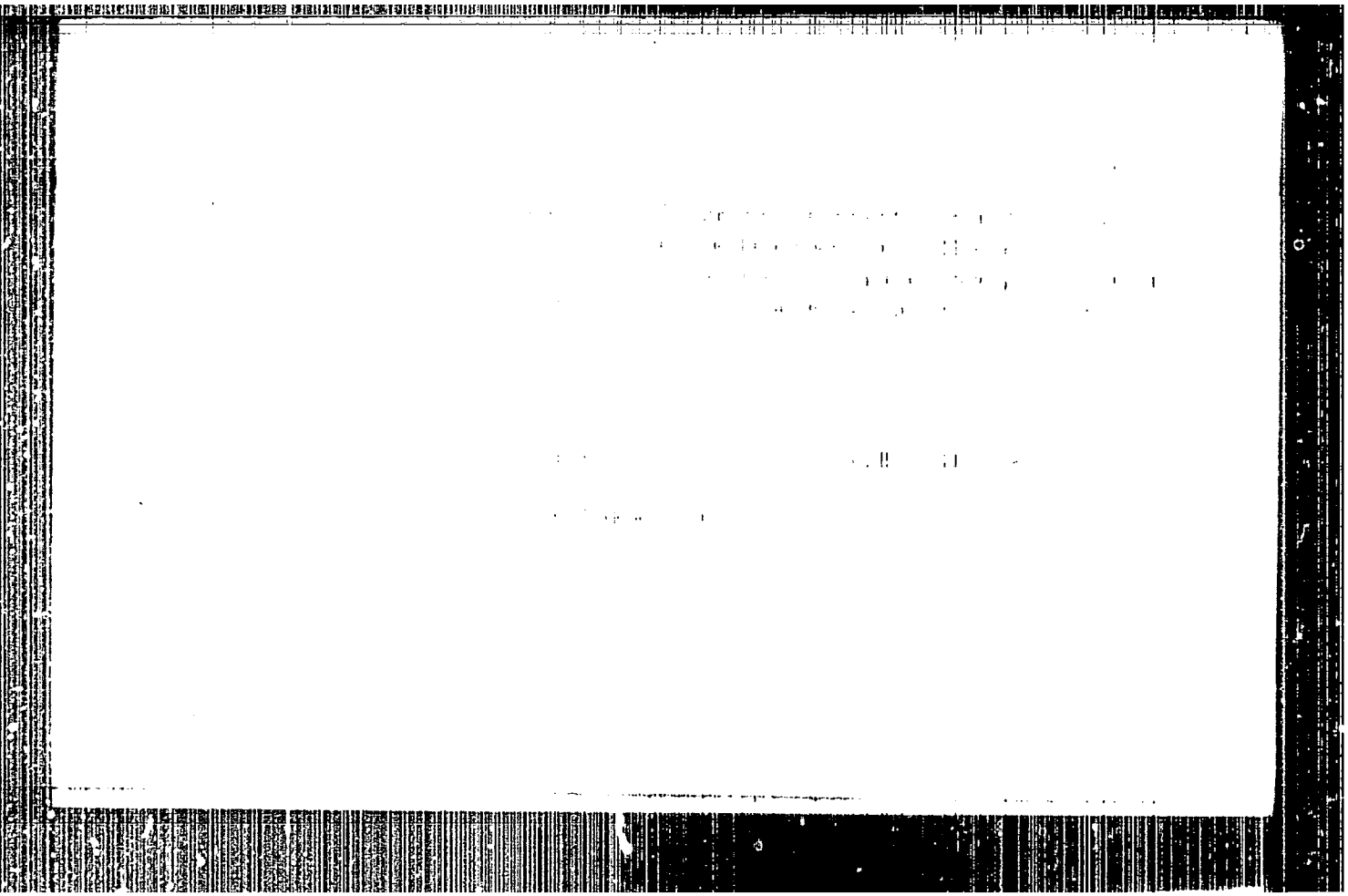
1. Saratov. Universitet. 2. Kafedra radiofiziki Saratovskogo
universiteta im. N.G.Chernyshevskogo (for all except Avilov,
Zenin).
(Radio)

IL'IN, V.S.; PITOVA, G.V.

Sulfhydryl groups of yeast hexokinase: their role in catalysis and in hormone action on enzyme activity. Vop.med.khim. 10 no.2:214-216 Mr-Ap '64. (MIRA 18:1)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad.

is known. The method is set forth as applied to four-pole irregularities in



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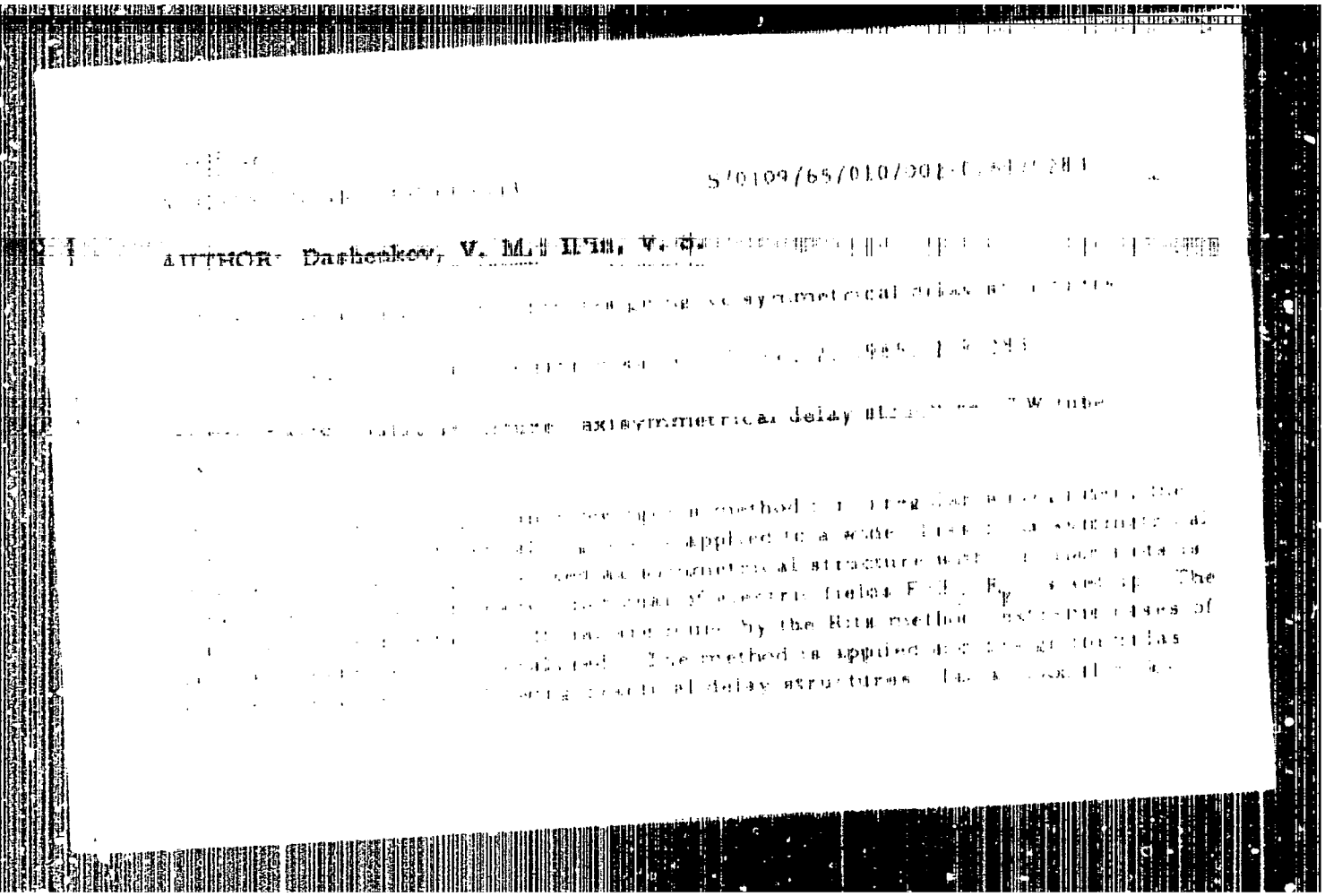


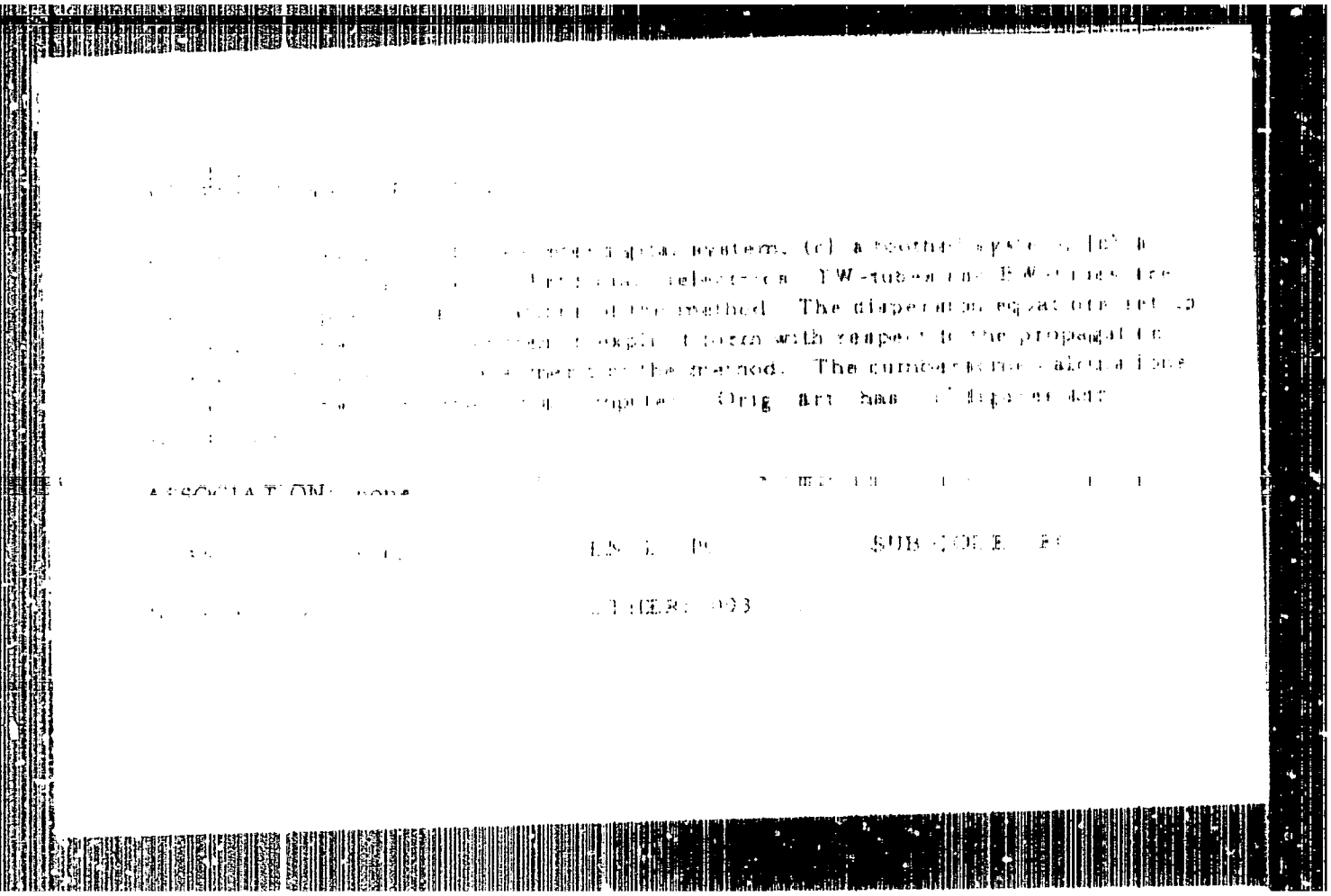
S/0109/65/010/001

AUTHOR: Dashenkov, V. M.; Il'in, V. [illegible]

[illegible] symmetrical [illegible]

[illegible] axisymmetrical delay [illegible] TW tube

[illegible] applied to a wide [illegible] axisymmetrical structure [illegible] The [illegible] of electric fields E_z, E_r [illegible] by the Ritz method [illegible] The method is applied [illegible] axisymmetrical delay structures [illegible]



KULIKOV, E.L.; IL'IN, V.S.; IL'IN, V.K.

Design of irregular waveguides using the "equivalent resonator" method. Izv. vys. ucheb. zav.; radiotekh. 8 no.1:18-26 Ja-F '65. (MIRA 18:5)

DASHENKOV, V.M.; IL'IN, V.S.

Variational method for calculating axisymmetrical delay systems.
Radiotekh. i elektron. 10 no.2:269-283 F '65.
(MIRA 18:3)

IL'IN, V.S.; STEPANOVA, N.G.

Activity of hexokinase, glucose-6-phosphate dehydrogenase and glucose-6-phosphatase of liver cell fractions in rabbit embryos and full-grown animals following introduction of glucocorticosteroids. Vop. med. khim. 10 no.6:576-584 N-D '64. (MIRA 19:1)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad.

DOKUSOVA, O.K.; IL'IN, V.S.

Changes in energy metabolism in the liver of chickens with biotin deficiency. Biokhimiia 29 no.5:854-862 Jl-Ag '64. (MIRA 18:11)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad.

IL'IN, V.S.; TITOVA, G.V.

Hormone-enzyme complex: insulin-hexokinase. Biokhimiia (MIRA 19:1)
30 no.6:1251-1256 N-D '65.

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad. Submitted April 3, 1965.

L 2608-66 EWT(1)/EWA(h)

ACCESSION NR: AP5020134 UR/0109/65/010/008/1540/1542
621.317.34

AUTHOR: Dashchenkov, V. N.; Il'in, V. S.

TITLE: Measuring the coupling resistance of delay systems by means of dielectric bars

SOURCE: Radiotekhnika i elektronika, v. 10, no. 8, 1965, 1540-1542

TOPIC TAGS: delay system

ABSTRACT: A measuring technique is suggested which permits easy determining of squared spatial harmonics of the longitudinal and transverse components of the standing-wave electric field $\bar{E}_z^2$ and $\bar{E}_\tau^2$ for substituting them into this formula $\xi = \alpha_z E_z^2 + \alpha_\tau(\theta) E_\tau^2$. The formula gives the relative detuning of a delay system caused by insertion of a thin isotropic dielectric bar; α_z and α_τ are the bar polarizabilities; θ is the angle between the transverse component E_τ and the x-axis. In order to determine the above spatial harmonics, it is recommended to measure the maximum and minimum detunings for perpendicular orientations of the probe with respect to E_τ. The formulas were verified experimentally on an interdigital delay system consisting of 32 studs into which a

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L 2608-66

ACCESSION NR: AP5020134

0.51 x 3.51-mm ebony strip was introduced. Orig. art. has: 2 figures, 12 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 18Nov64 ENCL: 00 SUB CODE: EC

NO REF SOV: 004 OTHER: 000

Card 2/2

L 27677-66 ENP(k)/ENT(1)/T GG

ACC NR: AP6007[illegible] SOURCE CODE: UR/0141/66/009/001/0016/0032

AUTHOR: Il'in, V. S.; Kostyunina, G. P.

ORG: Saratov State University (Saratovskiy gosudarstvennyy universitet)

TITLE: Diffraction of electromagnetic waves by ultrasonic waves in anisotropic medium -- Part 1

SOURCE: IVUZ. Radiofizika, v. 9, no. 1, 1966, 16-32

TOPIC TAGS: electromagnetic wave diffraction, ultrasonic diffraction

ABSTRACT: Diffraction patterns have been calculated by solving a scalar problem for the Fraunhofer zone; space effects in the medium, interface-reflection effects, etc. have not been fully accounted for (P. Debye, Ber. Sach. Akad. Wiss., v. 84, 125, 1932; C. Raman, N. Nath, Proc. Ind. Inst. Sc., 3(A), 75, 1936). The present article uses the variational method for studying the transmission of electromagnetic waves through an anisotropic layer (a crystal) whose dielectric constant is modulated by ultrasonic waves. Formulas for the diffraction field in both near and remote zones are developed. It is proven that, for the near zone, the system can be described by a diffusion matrix S of a 2(N + 1)-terminal network; this permits using the matrix method of circuit theory for studying various cascade connections of such devices. The above formulas cover, as particular cases, the classical formulas of scalar diffraction in an isotropic layer. Orig. art. has: 1 figure and 90 formulas.

SUB CODE: 20, 09 / SUBM DATE: 19Jul65 / ORIG REF: 009 / OTH REF: 007

Card 1/1

UDC: 621.371.167

L 31916-66 EWT(1)/T WR

ACC NR: AP6010726 SOURCE CODE: UR/0142/66/009/001/0081/0089

AUTHOR: Il'in, V. S.

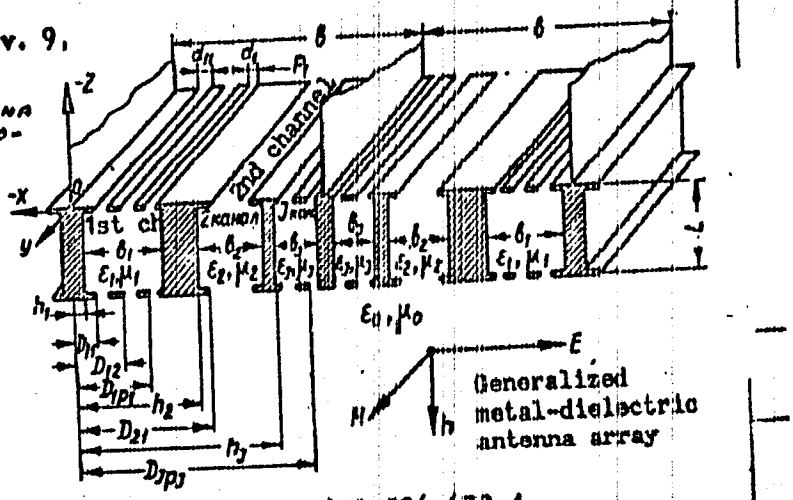
ORG: none

TITLE: Reflection properties of compound metal-dielectric arrays

SOURCE: IVUZ. Radiotekhnika, v. 9, no. 1, 1966, 81-89

TOPIC TAGS: SHF ANTENNA, ANTENNA ARRAY, DIELECTRIC PROPERTY, ELECTROMAGNETIC WAVE REFLECTION

ABSTRACT: General approximate formulas are developed for the reflection and transmission coefficients of a planar wave normally falling on a laminated dielectric slab reinforced with shaped metal parts (see figure). The formulas are in the integral form and are



UDC: 621.396.673.4

Card 1/2

L 27660-66

ACC NR: AP6008284 SOURCE CODE: UR/0109/66/011/003/0471/0476

AUTHOR: Dashenkov, V. M.; Il'in, V. S.; Navrotskaya, Yu. M.

ORG: none

TITLE: Calculating natural frequencies of axially-symmetrical resonators and critical wavelengths of regular waveguides

SOURCE: Radiotekhnika i elektronika, v. 11, no. 3, 1966, 471-476

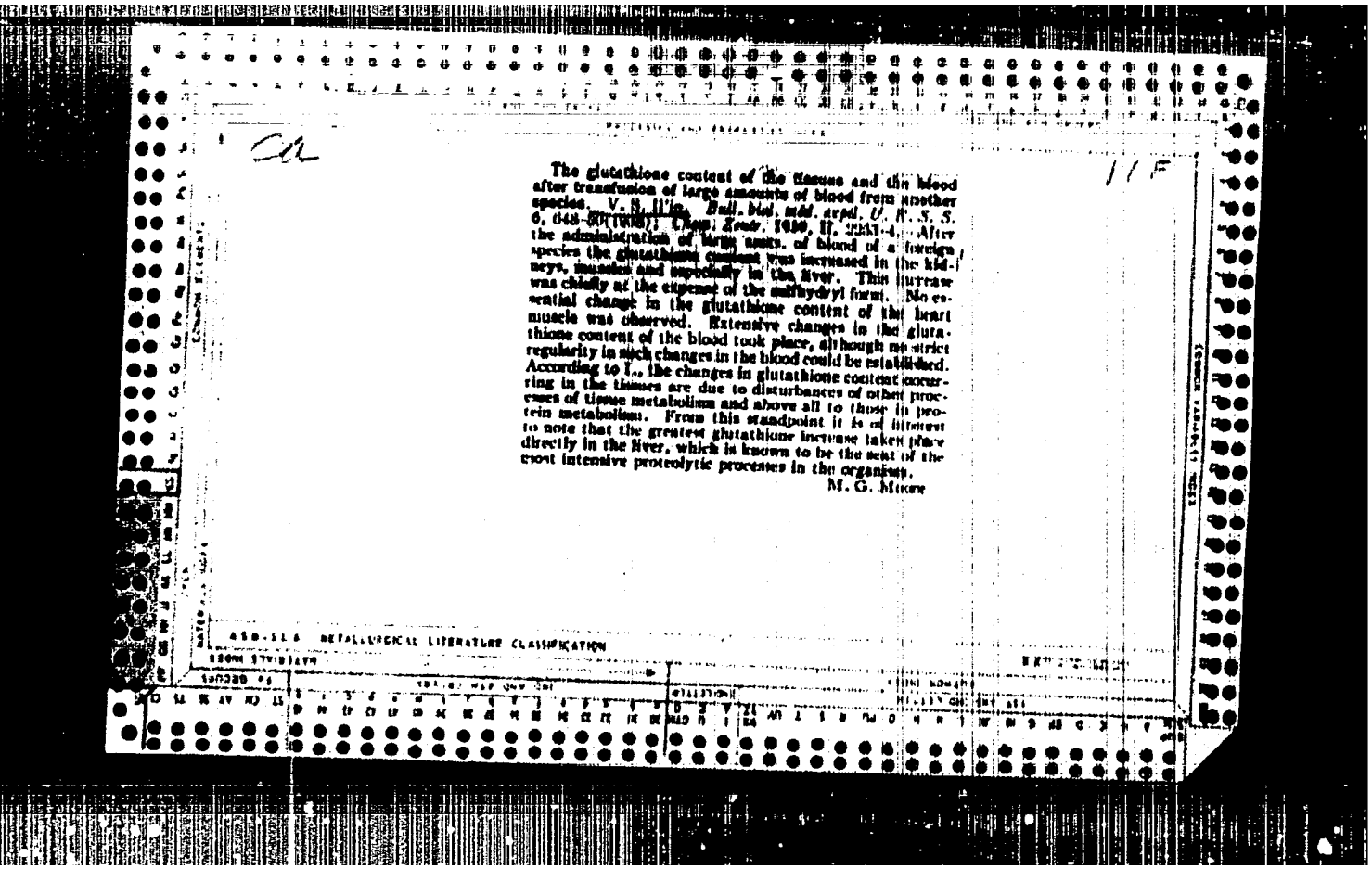
TOPIC TAGS: resonator, waveguide

ABSTRACT: The field structure in some periodic waveguides is such that description of the delay system, with $\varphi = 0$ and $\varphi = \pi$, can be reduced to consideration of the resonators whose configuration is determined by the geometry of one section of the delay system. Hence, the delay-system dispersion equation can be used for calculating the natural frequencies of such resonators. In an extreme case, when the radii of the delay system approximate infinity, the axially-symmetrical resonator "degenerates" into a shaped regular waveguide. Authors' formulas developed earlier (Rad. i elektronika, 1965, v. 10, no. 2, 269) for axially-symmetrical delay systems are adopted for single-ridge waveguides; this method is illustrated by a calculation of fundamental TE-mode in such a waveguide. Orig. art. has: 3 figures, 35 formulas, and 1 table.

SUB CODE: 09 / SUBM DATE: 16Nov64 / ORIG REF: 004 / OTH REF: 000

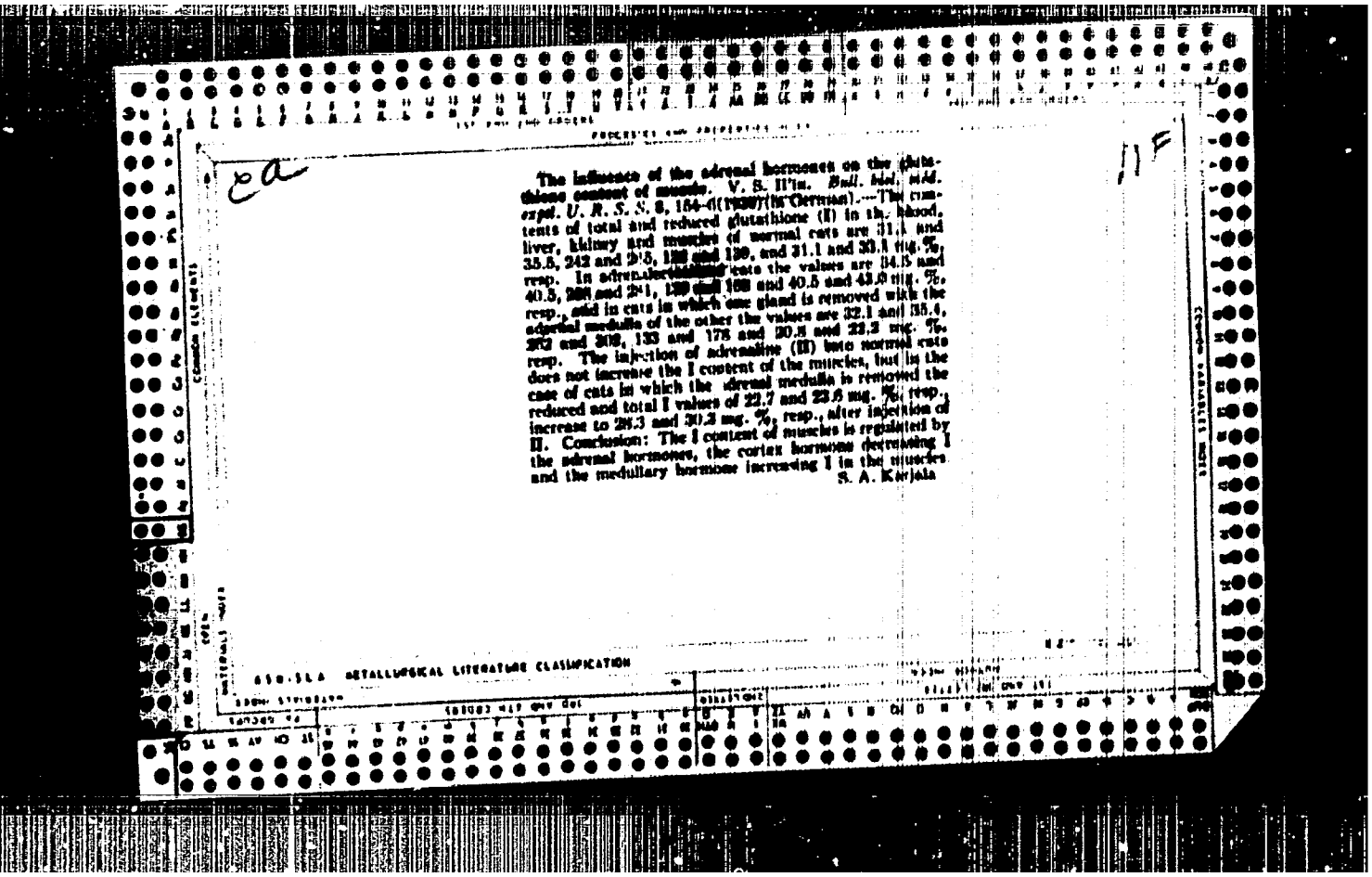
UDC: 621.372.834.001.24

Card 1/1

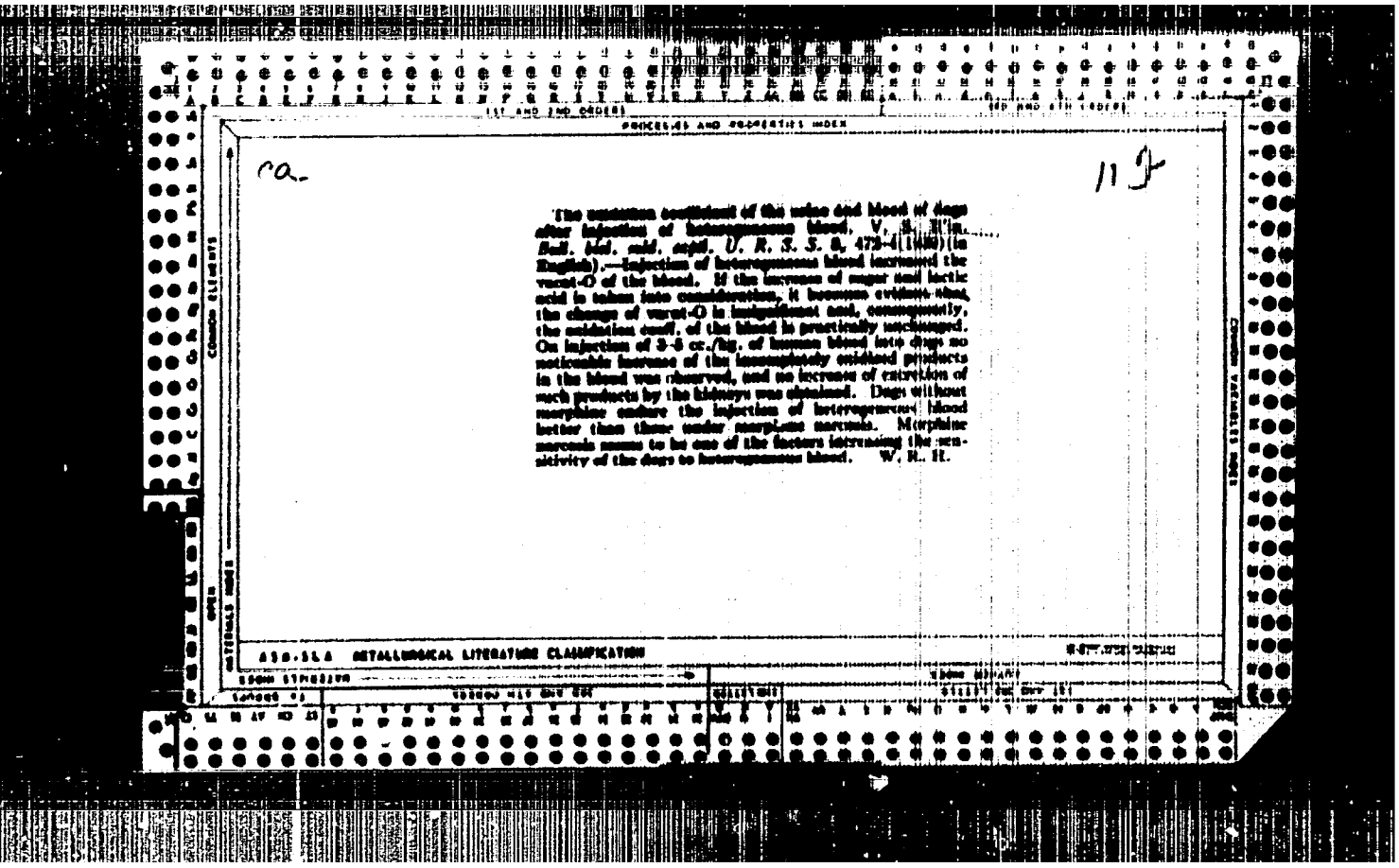


The glutathione content of the tissues and the blood after transfusion of large amounts of blood from another species. V. S. Il'in. *Bull. Biol. Med. exptl. U. S. S. R.* 6, 648-50(1938); *Chem. Zentr.* 1939, II, 2353-4. After the administration of large amts. of blood of a foreign species the glutathione content was increased in the kidneys, muscles and especially in the liver. This increase was chiefly at the expense of the sulfhydryl form. No essential change in the glutathione content of the heart muscle was observed. Extensive changes in the glutathione content of the blood took place, although no strict regularity in such changes in the blood could be established. According to I., the changes in glutathione content occurring in the tissues are due to disturbances of other processes of tissue metabolism and above all to those in protein metabolism. From this standpoint it is of interest to note that the greatest glutathione increase takes place directly in the liver, which is known to be the seat of the most intensive proteolytic processes in the organism.

M. G. Mikaye



The influence of the adrenal hormones on the glutathione content of muscle. V. S. Il'in. *Bull. biol. méd. exptl. U. R. S. S.* 8, 164-6(1939)(In German).—The contents of total and reduced glutathione (I) in the blood, liver, kidney and muscles of normal cats are 31.1 and 35.5, 242 and 248, 128 and 130, and 31.1 and 30.1 mg. %, resp. In adrenalectomized cats the values are 34.5 and 40.5, 208 and 241, 139 and 168 and 40.5 and 43.0 mg. %, resp., and in cats in which one gland is removed with the adrenal medulla of the other the values are 32.1 and 35.4, 202 and 208, 133 and 178 and 30.8 and 23.3 mg. %, resp. The injection of adrenaline (II) into normal cats does not increase the I content of the muscles, but in the case of cats in which the adrenal medulla is removed the reduced and total I values of 22.7 and 23.6 mg. %, resp., increase to 26.3 and 30.3 mg. %, resp., after injection of II. Conclusion: The I content of muscles is regulated by the adrenal hormones, the cortex hormone decreasing I and the medullary hormone increasing I in the muscles.
S. A. Kerjala



ca.

11 F

The oxidation coefficient of the urine and blood of dogs after injection of heterogeneous blood. V. S. Il'in. *Bull. biol. med. exptl. U. R. S. S.* 8, 473-4 (1939) (in English).—Injection of heterogeneous blood increased the vacat-O of the blood. If the increase of sugar and lactic acid is taken into consideration, it becomes evident that the change of vacat-O is insignificant and, consequently, the oxidation coeff. of the blood is practically unchanged. On injection of 3-5 cc./kg. of human blood into dogs no noticeable increase of the incompletely oxidized products in the blood was observed, and no increase of excretion of such products by the kidneys was obtained. Dogs without morphine endure the injection of heterogeneous blood better than those under morphine narcosis. Morphine narcosis seems to be one of the factors increasing the sensitivity of the dogs to heterogeneous blood. W. R. H.

A50-51A METALLURGICAL LITERATURE CLASSIFICATION

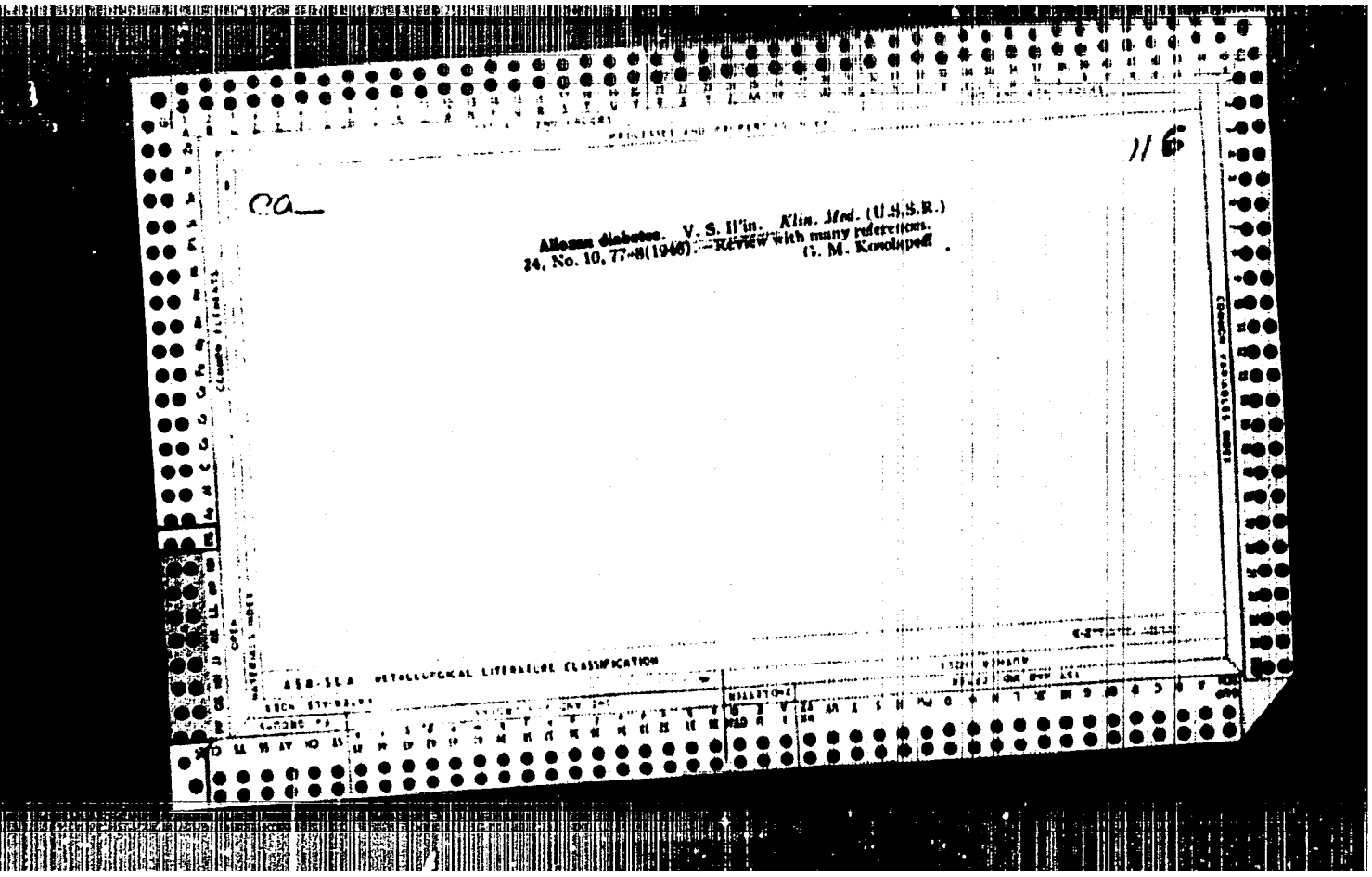
PROCESSES AND PROPERTIES INDEX

ca.

1F

Effect of hormones of the adrenal cortex and medulla on the glutathione content of blood. V. S. Il'in. *J. Physiol. U. S. S. R.* 28, 662 (in English, 663)(1940); cf. C. A. 34, 2435[9]. —The glutathione (I) content of liver, kidneys and blood of cats is only slightly increased by adrenalectomy, or by the removal of one and demedullation of the other adrenal gland. Adrenaline increases, and cortical hormone decreases the amt. of I in muscles. T. Laurer

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION



IL'IN, V. S.

USSR/Medicine - Fibrinogenase Nov/Dec 48
Fibrin, Fibrinogen

"Fibrinogenase," V. S. Il'in, Leningrad, 9½ pp

"Uspekh Sovrem Biol" Vol XXVI, No 3 (6)

Tests with blood obtained from corpses and from living organisms proved that fibrinogenase does not convert fibrinogen to fibrin; Transition occurs in another albumin (or other albumins) and there is no coagulation under the influence of thrombin. Name "Fibrinogenodestructase" is considered more proper on strength of above tests.

[redacted] 3/5054

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Ca

11 f

The fibrinogenic and fibrinolytic factors (fibrinogenase) of blood of people who met sudden death. V. S. Il'in. *Biokhimiya* 14, 354-60(1949); cf. Wohlisch and Jühling, C.A. 32, [illegible].—The blood of a person who died suddenly not only does not coagulate, but it possesses the property of liquefying coagulated blood of normal people and animals. The fibrinogenic and fibrinolytic factor of such blood is thermolabile, and is completely destroyed on heating at 55-58° for 40 min. An ext. of fibrinogenase can be prepd. from the lungs of people who died suddenly. The active fibrinogenase leaves the lungs and enters the body during sudden death. H. Priestley

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

ILIN, V. S.

U.S.S.R. / Human Animal Physiology. Metabolism. T

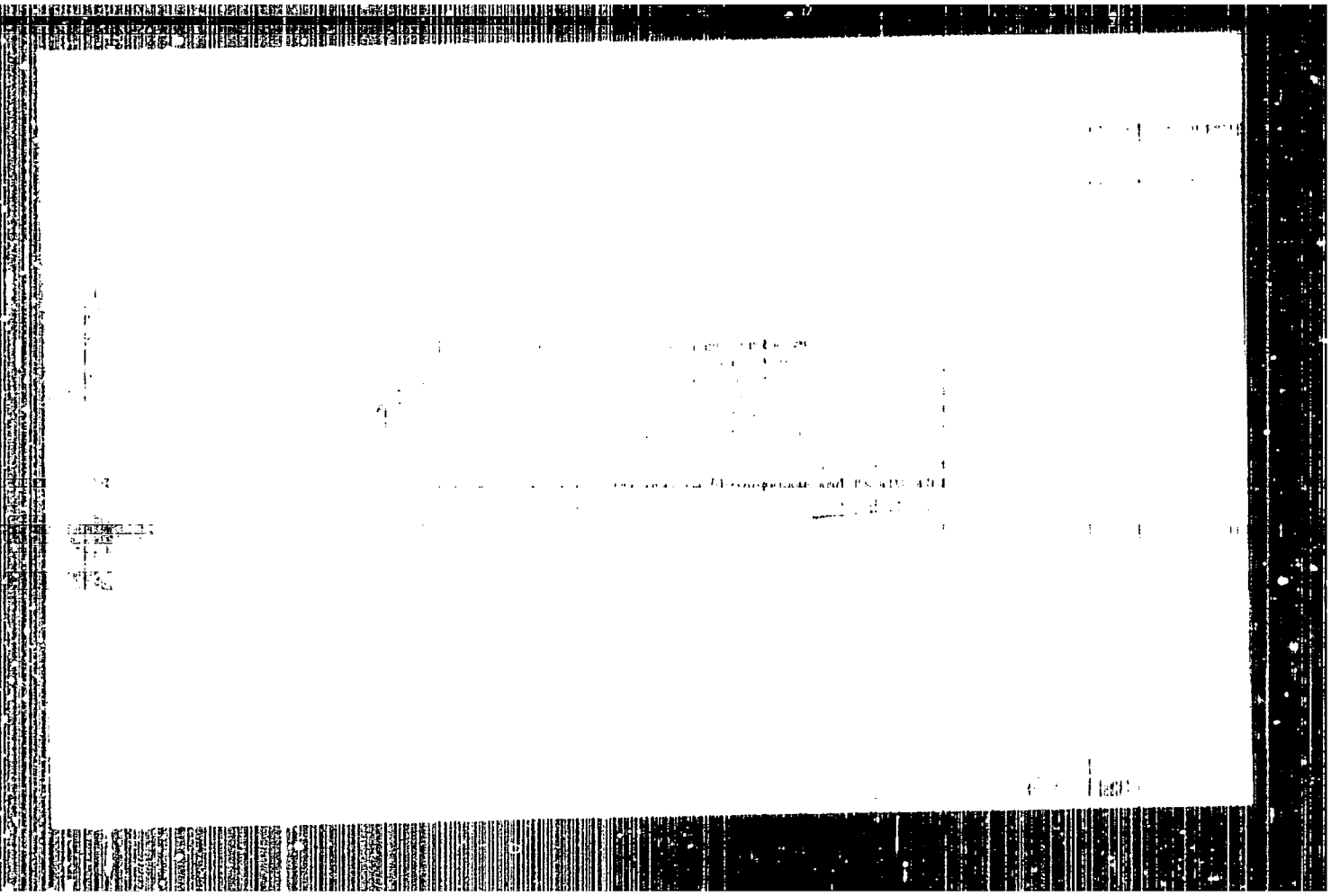
Abs Jour: Ref Zhur-Biol., No 5, 1958, 21837.

Author : ~~Ilin V. S.~~
Inst : Institute of Experimental Medicine-Academy of Medical Sciences, U.S.S.R.
Title : Regulation of Energy Metabolism and Its Mechanism.

Orig Pub: Yezhegodnik-Inst. Experim. Med. Nauk 1955, L 1956, 189-204.

Abstract: Resume: The significance of the process of oxidizing phosphorylation and of different enzyme systems partaking in this process was considered in reference to energy metabolism of the cell. Data were furnished concerning changes of these factors by elevation of body temperature and starvation.

Card 1/1



VESELKIN, N.V.; DAUDOVA, G.M.; IL'IN, V.S.

Method of determining the ability of tissues to synthesize reducing phosphorus organic compounds. Mat.po evol. fiziol. 1:76-78 '56. (MIRA 11:1)
(PHOSPHORUS ORGANIC COMPOUNDS)
(TISSUE CULTURE)

USSR / Human and Animal Physiology (Normal and Pathological). Blood. Blood Pressure. Hypertonia T

Abs Jour: Ref Zhur-Biologiya, No 21, 1958, 97574

Author : Veselkin, N. V., Il'in, V. S.

Inst : Not given

Title : Synthesis of Ethero-Sulfuric Acids in an Organism After Denervation of the Liver

Orig Pub: V Sb.: Materialy po evolyuts. fiziologii, T. I. M.-L., AN SSSR, 1956, 85-90

Abstract: No abstract

Card 1/1

41

IL'IN, V.S.; TITOVA, G.V.

Mechanism of the action of insulin on the hexokinase reaction.
Vop.med.khim. 2 no.3:203-209 My-Je '56. (MLRA 9:10)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad
(INSULIN, effects,
on hexokinase (Rus))
(TRANSPHOSPHORYLASES,
hexokinase, eff. of insulin (Rus))

IL'IN, V.S.; TITOVA, G.V.

Relation of hexokinase-inhibiting properties of β-lipoprotein fraction of blood serum to cortisone and insulin. Vop.med.khim. 2,no.4: 243-251 Jl-Ag '56. (MLRA 9:10)

1. Otdel biokhimii instituta eksperimental'noy meditsiny AMN SSSR, Leningrad.

(BLOOD PROTEINS,
β-lipoprotein fractions, inhib. of hexokinase, eff. of cortisone & insulin (Rus))
(TRANSPHOSPHORYLASES,
hexokinase, inhib. by blood β-lipoprotein fractions, eff. of cortisone & insulin (Rus))
(CORTISONE, effects,
blood β-lipoprotein fractions inhib. of hexokinase (Rus))
(INSULIN, effects,
same)

V

V.S. ILIN

USSR/ [illegible] Animal Physiology. Blood.

Abs Jour: Ref. Zhur-Biol., No 6, 1958, 26816.

Author : V.S. Il'in, T.I. Vol'fson, Z.A. Chaplygina and K.F. [illegible]

Inst :

Title : The Influence of the Nervous System on the Activity of Blood Fibrinogenase.

Orig Pub: Tr. Vses. obshchestva fiziol., biokhim. i farmakologov, 1956, 3, 117-118.

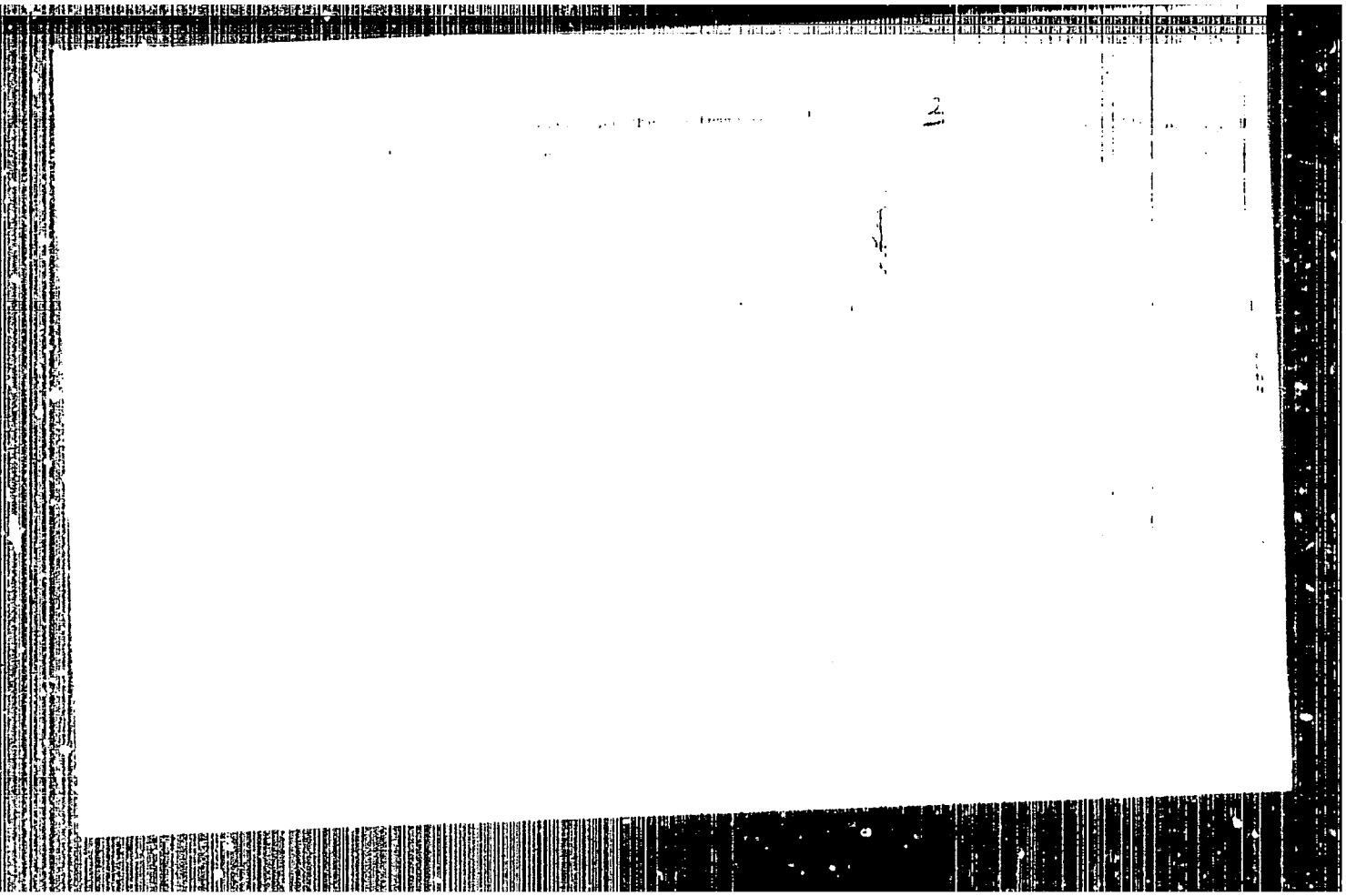
Abstract: Active fibrinogenase was not detected in the blood of 30 healthy individuals, but was found in the blood of 22 out of 40 surgical patients on the day preceding a serious operation. In these same patients the active enzyme was found in only five cases a day after the operation. Analogous data was obtained

Card : 1/3

[illegible] experi-
[illegible]ubrated cats.
[illegible]siderable im-
[illegible] system in the acti-
[illegible] the blood. In 13 out of

Card : 2/3

32



VESELKIN, N.V.; DAUDOVA, G.M.; IL'IN, V.S.

Acid-soluble phosphorus fractions in the mammary glands of rabbits and the activity of glands in synthesizing reducing phosphorus organic compounds. Mat.po evol. fiziol. 1:79-84 '57. (MIRA 11:1)
(MAMMARY GLANDS)
(PHOSPHORUS ORGANIC COMPOUNDS)

IL'IN, V.S.

Significance of hexokinase reaction and mechanisms regulating it. Ukr.biokhim.zhur. 30 no.6:911-943 '58. (MIRA 11:12)
(HEXOKINASE)

IL'IN, Vasiliy S., otv.red.; BIRYUKOV, D.A., red.; MEYFAKH, S.A., red.

[Phosphorylation and its functions; the 1958 symposium] Fosforilirovanie i funktsiia; simposium 1958 g. Leningrad, 1960. 377 p. (MIRA 14:7)

1. Akademiya meditsinskikh nauk SSSR, Moscow. Institut eksperimental'noy meditsiny.
(Phosphorylation)

KHARAUZOV, M.A., prof., glavnyy red.; MIKHAYLOV, V.P., prof., zamestitel' glavnogo red.; BIRYUKOV, D.A., prof., otv.red.; AVETIKYAN, B.G., doktor biol.nauk, red.; ANICHKOV, N.N., akademik, red.; ANICHKOV, S.V., prof., red.; ARBUZOV, S.Ya., prof., red.; VESELKIN, P.N., prof., red.; VOYNO-YASENETSKIY, M.V., prof., red.; DANILOV, I.V., kand.biol.nauk, red.; ZHABOTINSKIY, Yu.M., prof., red.; ZHINKIN, L.N., prof., red.; IL'IN, V.S., red.; IOFFE, V.I., prof., red.; KARASIK, V.M., prof., red.; KUPALOV, P.S., prof., red.; MANINA, A.A., kand.med.nauk, red.; NEYFAKH, S.A., doktor biol.nauk, red.; RIKKL', A.V., prof., red.; SVETLOV, P.G., prof., red.; SMORODINTSEV, A.A., prof., red.; CHISTOVICH, G.N., doktor med.nauk, red.; BESKHIN, I.K., tekhn. red.

[Yearbook of the Institute of Experimental Medicine of the Academy of Medical Sciences of the U.S.S.R. for 1958] Ezhegodnik za 1958 god. Leningrad, 1959. 538 p. (MIRA 14:1)

1. Akademiya meditsinskikh nauk SSSR, Moscow. Institut eksperimental'noy meditsiny. 2. Chleny-korrespondenty Akademii meditsinskikh nauk SSSR (for Biryukov, Veselkin, Il'in, Ioffe, Karasik, Svetlov, Smorodintsev). 3. Deystvitel'nyye chleny Akademii meditsinskikh nauk SSSR (for Anichkov, S.V., Kupalov).
(MEDICINE, EXPERIMENTAL)

IL'IN, V.S.; MEYFAKH, S.A.

Conference on the problem of "Phosphorylation and function." (MIRA 12:8)
Vop.med.khim. 5 no.2:153-159 Mr-Ap '59.
(PHOSPHORUS METABOLISM)

ILIN, V. S. (Prof.)

"Regulation hormonale de l'activite glucokinasique du foie."

report submitted for the 1st Intl. Symposium on Coris Ester and Phosphorylated Glucides, 16-18 Sept 1960, Milan, Italy

Director, Inst. Exptl. Medicine, Acad. Med. Sci. USSR

IL'IN, V.S., prof.

Nikolai Vasil'evich Veselkin; on his eightieth birthday. Fiziol. zhur. SSSR 46 no.1:91-92 Ja-F '60. (MIRA 13:5)

1. Chlen-korrespondent AMN SSSR.
(VESELKIN, NIKOLAI VASIL'EVICH, 1879-)

IL'IN, V.S.; SHANYGINA, K.I.

Hormonal regulation of the hexokinase reaction in the liver. Vop. med. khim. 6 no.3:291-300 My-Je '60. (MIRA 14:3)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny Akademii meditsinskikh nauk SSSR, Leningrad.
(LIVER) (HEXOKINASE) (DIABETES)
(CORTISONE) (INSULIN)

IL'IN, V.S.; TRYUFANOV, V.F.

Incorporation of Methionine-S^{35} in liver proteins of rats with alloxan diabetes under conditions of a block or "circumvention" of the glucokinase reaction. Vop.med.khim. 6 no.4:386-389 Jl-Ag '60. (MIRA 14:8)

1. Department of Biochemistry, Institute of Experimental Medicine, the U.S.S.R. Academy of Medical Sciences, and Chair of Biochemistry of the S.M.Kirov Institute for Postgraduate Medical Training, Leningrad.

(DIABETES) (METHIONINE) (LIVER)
(PROTEIN METABOLISM)

ILIN, V. S., TRUFANOV, N. F., SHANGINA, K. I. (USSR)

"The Inclusion of ^{35}S Methionine into Proteins of the Liver in Block and -Circumvention- of the Glucokinase Reaction."

Report presented at the 5th International Biochemistry Congress, Moscow, 10-16 Aug 1961

I'IN, V.S.; TRYUFANOV, V.F.

Inclusion of methionine-S^{35} into liver slices of rats with alloxan diabetes in a medium containing glucose or fructose. Vop. med. khim. 7 no. 1:82-85 Ja-F '61. (MIRA 14:4)

1. Chair of Biochemistry of the "S.M.Kirov" State Institute for Advanced Medical Training and Department of Biochemistry of the Institute of Experimental Medicine, Academy of Medical Sciences of the USSR, Leningrad.
(DIABETES) (LIVER) (METHIONINE)

IL'IN, V.S.; NLYFAKH, S.A.

Mechanisms of cellular and central regulation of energy metabolism.
Vest. AMN SSSR 16 no.11:47-55 '61. (MIRA 15:2)
(CELL METABOLISM) (NERVOUS SYSTEM)

IL'IN, V.S.; TITOV, G.V.

Reproduction in vitro of the effect of insulin on the hexokinase activity of the liver. Dokl. AN SSSR 141 no.1:227-229 N '61.
(MIRA 14:11)

1. Institut eksperimental'noy meditsiny Akademii meditsinskikh nauk SSSR. Predstavleno akademikom V.N.Chernigovskim.
(HEXOKINASE)
(INSULIN)
(LIVER)

IL'IN, V.S.; KILLEMA, L.A. [Kilbema, L.]

Effect of cortisone and insulin on the activity of hexokinase in leucocytes. Vop. med. khim. 8 no.4:374-376 Jl-Ag '62. (MIRA 17:11)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad i sektor biokhimii Instituta eksperimental'noy i klinicheskoy meditsiny AN Estonskoy SSR, Tallin.

IL'IN, V.S.; TITOVA, G.V.

Effect of insulin in vitro on the activity of hepatic glucose-6-phosphate dehydrogenase and glucose-6-phosphatase. Biokhimiia 28 no.6:987-991 N-D'63 (MIRA 17:1)

1. Department of Biochemistry, Institute of Experimental medicine, Academy of Medical Sciences, Leningrad.

ZBARSKIY, Boris Il'ich [deceased]; IVANOV, Il'ya Il'ich;
MARDASHEV, Sergey Rufovich; IL'IN, V.S., red.

[Biological chemistry] Biologicheskaia khimiia. 4. izd., ispr. i dop. Leningrad, Meditsina, 1965. 519 p.
(MIRA 18:6)

GROMOVA, K.G.; IL'IN, V.S.

Identification of glucokinase in the adipose tissue of the epididymis of rat testicle and the stimulating effect of insulin on its synthesis. Biokhimiia 30 no.4:752-758 Jl-Ag '65. (MIRA 18:8)

1. Otdel biokhimii Instituta eksperimental'noy meditsiny AMN SSSR, Leningrad.

IL'IN, V. S., CAND AGR SCI, "INTERVARIETAL HYBRIDS OF CORN IN OMSKAYA OBLAST." OMSK, 1961. (AUTHOR'S ABSTRACTS OF DISSERTATIONS PRESENTED AT OMSK AGR INST IM S. M. KIROV). (KL, 3-61, 225).

IL'IN, V.S.

10 июня

(с 10 до 16 часов)

Ю. К. Мур[illegible]

[illegible]

В. Н. Т[illegible]

К вопросу о [illegible]

В. Г. [illegible]

[illegible]

10 июня

(с 18 до 22 часов)

Г. Л. [illegible]

[illegible]

А. Н. [illegible]

[illegible]

В. С. [illegible]

Н. А. [illegible]

[illegible]

С. Н. [illegible]

[illegible]

В. Д. [illegible]

А. Н. [illegible]

[illegible]

11 июня

(с 10 до 16 часов)

В. С. [illegible]

[illegible]

В. С. [illegible]

[illegible]

В. Н. [illegible]

О [illegible]

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

IL'IN, V.S.

Variational method of calculating symmetrical tetrapolar inhomogeneities in rectangular wave guides. Izv.vys.uchab.zav.; radiofiz. 3 no.4:683-693 '60. (MIRA 13:9)

1. Saratovskiy gosudarstvennyy universitet.
(Wave guides)

KAMILOVA, L.V.; YENIKOLOPYAN, N.S.; MALBANDYAN, A.B.; IL'IN, V.T.
(Moskva)

Kinetics and mechanism of methane oxidation. Part 5: Constant rate of methane oxidation. Zhur. fiz. khim. 35 no.7:1435-1442 Jl '61. (MIRA 14:7)

1. Akademiya nauk SSSR, Institut khimicheskoy fiziki.
(Methane) (Oxidation)

L 10716-66 EWT(d)/EWT(1)/EPF(n)-2/EWP(1) IJP(c) BB/WW/JG

ACC NR: AP5028515 SOURCE CODE: UR/0286/65/000/020/0098/0098

44,55 44,55 44,55 44,55

AUTHORS: Il'in, V. V.; Vasil'yev, G. I.; Novikov, I. B.; Tevelova, R. P.

10
13

ORG: none

TITLE: Analog-digital device for simulating problems of nonstationary heat conduction. Class 42, No. 175750

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 98

21, 44, 55

TOPIC TAGS: temperature simulation, analog digital converter, heat conduction

16, 44

ABSTRACT: This Author Certificate presents an analog-digital device for simulating nonstationary heat conduction. The device contains a network of ohmic resistances and a device for setting the boundary conditions. To increase the accuracy of simulation, the device contains a code-to-analog converter for each node, which operate alternately in a storage and a voltage setting mode. There is also one analog-to-code converter common to all the nodes, which is connected sequentially through an electronic switch to the nodes of the network.

Card 1/2 UDC: 681.14.001.572

L 10716-66
ACC NR: AP5028515

Codes proportional to the voltages at these points are supplied to the inputs of the code-to-analog converters operating in the storage mode.

SUB CODE: 09/ SUBM DATE: 18Jul64

Card 2/2

E/044/63/000/002/040/050
A060/A126

AUTHORS: Il'in, V.V., Borshchev, V.B., Rokhlin, F.Z.

TITLE: Can a machine think? (Survey of some viewpoints). [In order of discussion]

PERIODICAL: Referativnyy zhurnal, Matematika, no. 2, 1963, 44, abstract 2V213 (Tr. Kazansk. aviats. in-ta, 1961, 1961, no. 65, 65 + 80)

TEXT: In the authors' opinion, among a number of philosophical problems of cybernetics under discussion one problem which was raised and given differing solutions by many cyberneticians requires further discussion. "The problem deals with the possibility or impossibility of carrying out an analogy between a computer and the brain to the point of admission (or negation) that there arises a property in a computer identical or close to consciousness or, more clearly, to thought. Can a machine think? - This clear question produces two mutually exclusive viewpoints: yes or no". The authors analyze the basic arguments in support of the impossibility in principle of designing a thinking machine: the algorithmic undeterminability of certain problems, the nonreducibility of think-

Card 1/2

Can a machine think? ....

S/144/63/000/002/040/050
A060/A126

ing, as a special form of motion of matter, to the physical form of motion of matter (to a lower form); the impossibility of simulating the subjective psychological universe of man; in the authors' opinion none of these arguments can be admitted as conclusive. "On the basis of the absence of contradiction to the idea of the possibility of designing a thinking machine by any laws of science or philosophy, this idea is admissible as a fully fledged scientific hypothesis. Future experience will solve the question of the truth of this hypothesis". In conclusion, the authors develop the thought that "in a whole number of works in the last few years an attempt is present to comprehend the changes introduced into the content of attributes of matter by the science of the twentieth century, .. the so-called ontological nongeocentrism". Carrying out an analogy between quantum theory, the theory of relativity, the authors consider that cybernetics apparently is the science which gives us the first foundation for discovering the elements of geocentrism in our consciousness and knowledge", since, "by deciding in the affirmative the problem of the possibility of creating a thinking machine we thus admit that there can exist not just a unique highly organized material system (the brain) in which consciousness arose ... that other forms of highly organized material systems in which consciousness arises are possible and exist."

Card 2/2 [Abstracter's note: Complete translation] A.M. Kondratov

PRIMER, A.I.; ZAYTSEV, P.V.; IL'IN, V.V.; MITEKHIN, Ye.P.

Apparatus for thermal and cathodic atomization and etching of metals in a gas discharge. Zav.lab.22 no.2:238-240 F '56. (MLRA 9:6)
(Metallography--Apparatus and supplies)

SOV/48-23-2-1/20

21(7)
AUTHORS: Bashilov, A. A., Il'in, V. V.

TITLE: The Coefficients of the Internal Conversion of Some Nuclear Transitions in As^{75} (Koeffitsiyenty vnutrenney konversii nekotorykh yadernykh perekhodov v As^{75})

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 2, pp 154-158 (USSR)

ABSTRACT: In a previous paper (Ref 4) the authors determined the coefficients of the internal conversion (CIC) of some nuclear transitions in As^{75}, that is to say, they determined the absolute value

$$\alpha_K = g\tau \frac{n_e}{n_\gamma}$$

by measuring the number of conversion electrons n_e by means of the magnetic spectrometer and by measuring the number of photoelectrons n_γ struck out of a calibrated target by use of one and the same radioactive source. τ, the photoelectric absorption coefficient and g, the energy function are the parameters of the apparatus, which were determined with

Card 1/3

specially calibrated samples and γ-rays with well known CIC. The target was calibrated with γ-rays of ThB, Au^{198} and Cs^{137} (Fig 1). The authors determined the CIC for nuclear transitions in As^{75} with the energies E_γ = 265, 280, 305 and 401 kev, which correspond to direct transitions from these energy levels into the ground state of As^{75}. Due to the fact that the intensity of E_γ = 305 and 401 kev is considerably weaker as compared to E_γ = 265, 280 kev, two radiation sources of different thickness with σ = 0.1 mg/cm^2 and σ = 0.5 mg/cm^2 were used. Figures 2, 3, 4 and table 1 contain the experimental data for τ, g, n_e/n_γ and α_K. For comparative data of other authors see table 2. There is a deviation by about 10%. The determination of the transition types resulting from a comparison of the theoretical and experimental values of α_K is given in table 3. For the energies E_γ = 401, 305, 280, 265 kev spin and parity of the individual levels were determined to be: $5/2^+$, $9/2^+$, $5/2^-$, $3/2^-$ (ground state); corresponding transitions:

Card 2/3