LUK'YANOV, A.A.; ORLOV, V.V.

[Effect of the resonance structure of cross sections on neutron diffusion] Vliianie rezonansnoi struktury sechenii na diffuziiu neitronov. Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 19 p. (MIRA 17:1)
(Neutrons--Capture) (Neutrons--Scattering)

32983
S/641/61/000/000/010/033
B104/B102

26.2245

AUTHORS: Luk'yanov, A. A., Orlov, V. V.

TITLE: Effect of the cross section resonance structure on neutron diffusion

SOURCE: Krupchitskiy, P. A., ed. Neytronnaya fizika; sbornik statey. Moscow, 1961, 105 - 115

TEXT: The authors derive expressions for the cross section and the diffusion coefficient of a neutron flux for the case of a resonant interaction of the neutrons with the nuclei of a medium. The resonance characteristics of the U^{238} nucleus in the energy range of 200 ev to 50 kev are determined and the diffusion parameter for different U^{238} concentrations, different temperatures and energies are averaged. The diffusion cross section and the diffusion coefficient depend essentially on the U^{238} concentration in the mixture and on the temperature of the medium. For $E < 50$ kev the single-level approximation gives sufficiently accurate values if the effective resonance width does not exceed the mean distance

Effect of the cross section ...

between the levels. In this range the resonance width is $\Delta \approx \sqrt{E}/50$ ($T = 300^{\circ}K$, E in ev). In the energy range above 50 kev self-screening decreases considerably, and the resonance width exceeds the mean distance between the levels. The maximum resonance cross section is then $\sigma(0, \xi) \approx \frac{\sqrt{\pi}}{2} \sigma(0) \xi$, where $\sigma(0) = 4\pi\lambda^2$. At $T = 300^{\circ}K$ $\xi \sim 0.1$. Thus, at $E \gtrsim 30$ kev, $\sigma(0, \xi)$ can be compared with the potential scattering cross section $\sigma_s^0 \approx 10$ barn: $\sigma(0, \xi) \approx \frac{\sqrt{\pi}}{2} \cdot \frac{2.6 \cdot 10^3}{E(\text{kev})} 0.1(\text{barn}) \approx \frac{230}{E(\text{kev})}$ barn. The authors thank I. I. Bondarenko and I. V. Gordeyev for taking part in the discussions. There are 1 figure, 4 tables, and 12 references: 5 Soviet and 7 non-Soviet. The four most recent references to English-language publications read as follows: Wigner E., J. Appl. Phys., 26, 260 (1955); Dresner L., Nucl. Sci. and Engng., 1, 68 (1956); Lane A. M., Lynn J. E. Proc. Phys. Soc., A70, no. 8, 557 (1957); Macklin R. L., Pomerance H. S. Progress in Nuclear Energy, 1, no. 1, Pergamon Press, Lond., 1956, 179.

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20180

S/089/61/010/003/010/021
B102/B205

24.6520

AUTHORS: Luk'yanov, A. A., Orlov, V. V.

TITLE: Theory of the cross sections of heavy nuclei within the range of partial overlap of neutron resonances

PERIODICAL: Atomnaya energiya, v. 10, no. 3, 1961, 262-264

TEXT: In Ref. 1 ("Neytronnaya fizika", Gosatomizdat, Moscow 1961), the authors presented a universal theory of the calculation of cross sections. In the present "Letter to the Editor", they suggest a simple method of calculating cross sections within the range of partial overlap of resonances. In an infinite homogeneous medium, the cross section is given by

$$\langle\sigma_x(E)\rangle = \int_{E_1}^{E_1+\varepsilon} (\sigma_x/\sigma)dE' \Big/ \int_{E_1}^{E_1+\varepsilon} (1/\sigma)dE' ,$$ where σ is the total cross section, and σ_x the reaction cross section; ε is a certain energy range, within which the collision density varies insignificantly. The cross section in the

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interval $(E_1, E_1+\epsilon)$ is given by $\overline{\sigma_x(E)} = (1/\epsilon)\int_{E_1}^{E_1+\epsilon} \sigma_x(E')dE'$. Here, a range of energies is considered, in which the actual cross section differs only slightly from the mean cross section: $|(\sigma - \bar{\sigma})|/\bar{\sigma} \ll 1$. If $\bar{\sigma} + (\sigma - \bar{\sigma}) = \sigma$, then

$$\frac{\sigma_x}{\sigma} = \frac{\sigma_x}{\bar{\sigma}+(\sigma-\bar{\sigma})} = \frac{\sigma_x}{\bar{\sigma}} - \frac{\sigma_x(\sigma-\bar{\sigma})}{\bar{\sigma}^2} + \ldots; \qquad (3),\ (4).$$

$$\frac{1}{\sigma} = \frac{1}{\bar{\sigma}} - \frac{\sigma-\bar{\sigma}}{\bar{\sigma}^2} + \ldots$$

By substituting this result in the initial equation, one obtains a simple expression for $\langle\sigma_x(E)\rangle$ [Abstracter's note: This formula is incorrect].

The correction to the mean cross section is calculated next. This correction determines the dependence of the cross section on both the absorber concentration in the medium and on the temperature. The cross section for

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the energy E is represented in the form of a sum of the contributions of the various resonances: $\sigma_x(E) = \sum_\gamma \sum_{m=-\infty}^{\infty} \sigma_{x\gamma}^m (E - E_m)$, where m denotes the m-th resonance. The total cross section is given by

$\sigma(E) = \sum_\gamma \sum_{m=-\infty}^{\infty} \sigma_{r\gamma}^m (E - E_m) + \sigma_{s_{pot}} = \sigma_r + \sigma_{s_{pot}}$. The subscript γ refers to a certain system of resonance levels which are characterized by the total spin J and the parity. The ordinary formula

$\sigma_{x\gamma}^m(E) = \sigma_{x\gamma}^{0m} \psi\left(\frac{E - E_m}{\Gamma} 2; \Gamma/\Delta\right)$, where $\sigma_{x\gamma}^{0m}$ and ψ are the cross section in the maximum and the Doppler function, respectively. Next, the case is discussed, in which the Doppler function is greater than the total resonance width, which is characteristic of heavy nuclei. Here, the form of resonance is satisfactorily described by

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$$\psi\left(\frac{E - E_m}{\Gamma} 2; \Gamma/\Delta\right) \simeq \frac{\sqrt{\pi}}{2} \frac{\Gamma}{\Delta} \exp\left[-\frac{(E - E_m)^2}{\Delta^2}\right].$$

Supposing that $\bar{D}_J$ is the mean distance between levels with given J and given parity in the energy interval concerned, and that the levels are equally distant from one another, it can be shown that taking account of the spread of D_J^m leads to a deviation of 4-5% from the mean cross section. Consideration of the distribution of reduced resonance widths has a much greater influence. For nearly equidistant levels one has

$$\sigma_x(E) \simeq \sum_\gamma \sum_m \alpha_\gamma^{xm} e^{-(y+mb_J)^2}, \quad (10)$$

$$\alpha_\gamma^{xm} = \frac{\sqrt{\pi}}{2} \frac{\Gamma}{\Delta} \sigma_{x\gamma}^{0m}; \; y = \frac{E - E_0}{\Delta}; \; b_J = \frac{\bar{D}_J}{\Delta}.$$

(10).

Now, the mean value of the product

$$\bar{\sigma}_x \bar{\sigma}_r = \sum_{\gamma\gamma'} \sum_{mm'} \alpha_\gamma^{xm} e^{-(y + mb_J)^2} \alpha_{\gamma'}^{rm'} \cdot e^{-(y + mb_{J'})^2}$$

is calculated:

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$$\overline{\sigma_x\sigma_{x'}}=\frac{\Delta}{\varepsilon}\left[\sum_{\nu\nu'}\overline{\alpha_\nu^x\alpha_{\nu'}^{x'}}\int_{\left(\frac{\varepsilon}{\Delta}\right)}\theta^2\left(b_J,\frac{y}{b_J}\right)dy+\right.$$

$$\left.+\sum_{\nu}\left(\overline{\alpha_\nu^x\alpha_\nu^{x'}}-\overline{\alpha_\nu^x}\,\overline{\alpha_\nu^{x'}}\right)\int_{\left(\frac{\varepsilon}{\Delta}\right)}\theta\left(\sqrt{2}\,b_J,\frac{y}{b_J}\right)dy\right]. \quad (12)$$

(12).

$\theta(u, z) = \sum_{m=-\infty}^{\infty} e^{-u^2(z+m)^2}$ is a periodic function with the period $z = 1$.

It is expanded in a Fourier series which converges rapidly for $u<\pi$. This is the case with heavy nuclei for E>1kev. If the expansion is discontinued after the second term, one has

$\theta(u, z)\simeq\frac{\sqrt{\pi}}{u}(1 + 2e^{-\pi^2/u^2}\cos 2\pi z)$. Substitution of this expression leads to

$$\overline{\sigma_x\sigma}-\overline{\sigma_x}\,\overline{\sigma}=\sum_{\nu}\overline{\sigma_\nu^x\sigma_\nu^{x'}}\left\{2\exp\left[-\left(\frac{2\pi}{b_J}\right)^2\right]+\right.$$

$$\left.+\frac{b_J}{\sqrt{2\pi}}\frac{\Phi_x}{S_x}\right\}. \quad (16)$$

(16).

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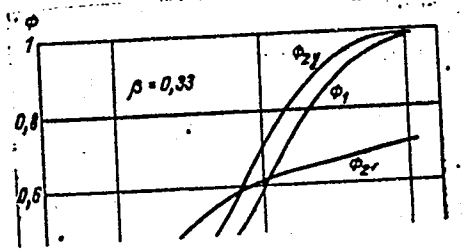
S_x and Φ_x account for the effect of the distribution of reduced widths upon the cross section. The function

$$\Phi_x(E)=\left\langle\frac{\Gamma_n^2\Gamma_x}{\Gamma}\right\rangle\Big/\frac{\langle\Gamma_n\rangle^2\langle\Gamma_x\rangle}{\langle\Gamma\rangle}-\left\langle\frac{\Gamma_n\Gamma_x}{\Gamma}\right\rangle\Big/\frac{\langle\Gamma_n\rangle\langle\Gamma_x\rangle}{\langle\Gamma\rangle} \quad (17)$$

was calculated for one (Φ_1) and two (Φ_{2f}, $\Phi_{2\gamma}$) channels of the reaction



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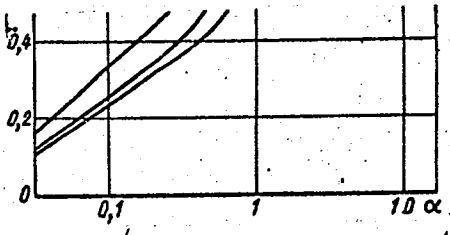
Theory of the ...



(cf. Fig.) with $\alpha = (\langle\Gamma_\gamma\rangle/\langle\Gamma_n\rangle)$ and $\beta = (\langle\Gamma_\gamma\rangle/\langle\Gamma_f\rangle)$. Results of calculation of the cross sections, in which the resonance blocking for an infinite U^{235} lump ($\sigma_{s_{pot}}$ = 10 barns) at 300°K has been taken into account, are summarized in a table. The blocking effect of resonances is significant only at energies of up to 10 kev. At higher energies, the resonances overlap. The method is particularly suited for the calculation of heavy nuclei, and for estimating thermal effects in systems with fast and intermediary neutrons. Thus, the authors used this method to calculate the concentration ratio of U^{238} to U^{235} in an infinite medium at 300°K and obtained $\varrho_8/\varrho_5 \leqslant 0.675$, which gives a better description illustration of the actual situation than do the results of other authors. There are 1 figure, 1 table,

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and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc.

SUBMITTED: April 27, 1960

E, Mev	$\bar{\sigma}_f$	$\bar{\sigma}_\gamma$	$\langle\sigma_f\rangle$	$\langle\sigma_\gamma\rangle$
1	12,75	8,46	6,88	4,51
2	9,66	6,08	6,45	4,47
5	6,43	3,70	5,51	3,24
7	5,94	3,27	5,39	2,97
10	5,05	2,67	4,82	2,51
50	2,30	0,67	2,29	0,67

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45141

S/089/63/014/002/012/019
B102/B186

26.2247

AUTHORS: Kremnev, V. A., Luk'yanov, A. A.

TITLE: Spatial distribution of neutron resonance absorption in a lump

PERIODICAL: Atomnaya energiya, v. 14, no. 2, 1963, 216-217

TEXT: For a lump imbedded in moderator material, the resonance absorption in a unit volume dv around a point with the coordinate $\vec{r}$ is characterized by the effective resonance absorption integral

$$J(r)=\frac{1}{Q\,dv}\int_u\int_v \Sigma_c(u)\,\varphi(u,r)\,du\,dv=\int_u \sigma_c(u)\,\varphi(u,r)\,du, \qquad (1)$$

representing the ratio of resonance neutrons absorbed in dv to the total of absorber nuclei; $\varphi(u,\vec{r})$ is the neutron flux at point $\vec{r}$ with the lethargy u, Q is the absorber nucleus concentration in the lump and $\sigma_0(u)$ is the absorption cross section. In a range where resonances may be considered as isolated, $J(r)=\sum_i J^i(r)=\sum_i\int_u \sigma_c^i(u)\,\varphi(u,r)\,du$, (1a). The method suggested here takes account of the resonance absorption of slowed-down

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neutrons in "narrow-resonance" approximation. It is based on the use of the one-group transport-theoretical equations (B.Davison, Neutron Transport Theory): $\varphi(u, r)=\Sigma_{sp}\int_v K(r'\to r)\,dv+\int_s K(r'_s\to r)\,dS\,|\Omega_n|$. (2)

$|\Omega_n|$ is the cosine of the angle between $\vec{r}'_s-\vec{r}$ and the surface normal at $\vec{r}'_s$, dS is the surface element around $\vec{r}'_s$, Σ is the total cross section, $\Sigma=\Sigma_{sp}+\Sigma_r=\varrho(\sigma_{sp}+\sigma_r)$, where σ_{sp} and σ_r are the cross sections of potential scattering and resonance. $K(r'\to r)=\frac{1}{4\pi}\frac{e^{-\Sigma|r-r'|}}{|r-r'|^2}$;

$$\varphi(u, r)=\frac{\sigma_{sp}}{\sigma}+\frac{\sigma_r}{\sigma}\int_s K(r'_s-r)\,|\Omega_n|\,dS=\frac{\sigma_{sp}}{\sigma}+\frac{\sigma_r}{\sigma}\varphi^*(u, r). \qquad (2a)$$

where $\varphi^*(u,\vec{r})$ is the neutron flux distribution in the lump after the first collision, when the lump surface is assumed to be uniformly covered with isotropic neutron sources. From (2a) and (1a) one obtains

$$J^i(r)=\int_{(E)}\frac{\sigma_c^i\sigma_{sp}}{\sigma}\frac{dE}{E}+\int_E\frac{\sigma_c^i\sigma_r^i}{\sigma}\varphi^*[\Sigma(E), r]\frac{dE}{E}. \qquad (3)$$

when u is replaced by E. This relation is used for calculating the spatial resonance absorption distribution for a UO_2 cylinder of R=0.5 cm,

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Spatial distribution of neutron ...

and 300 and 0°K. The curve for 300°K agrees completely with the experimental data (G. Smith et al. J.Nucl.Sci. and Engng.,9,421,1961). $\varphi^{i}(\Sigma,\vec{r})$ is taken from Rosen et al.(Phys.Rev.118,687,1960). If Doppler broadening of the resonances is negligible, one obtains $J^{i}(\vec{r})=J_{v}^{i}P(\Sigma_{sp},\vec{r})$ where $J_{v}^{i}=\int_{(E)}\frac{\sigma_{c}^{i}\sigma_{sp}}{\sigma}\frac{dE}{E}$ $P(\Sigma_{sp},r)=\frac{1}{4\pi}\int_{s}\frac{dS|\Omega_{n}|}{|r-r_{s}'|^{2}}\left[\frac{e^{-\Sigma_{sp}|r-r_{s}'|}}{\sqrt{\pi\Sigma_{sp}|r-r_{s}'|}}+\Phi\left(\sqrt{\Sigma_{sp}|r-r_{s}'|}\right)\right]$ (6); Φ is the error integral, and $P(\Sigma_{sp},\vec{r})$ is the shielding coefficient. There are 2 figures.

SUBMITTED: May 21, 1962

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L 38575-65

ACCESSION NR: AR5002961 S/0264/64/000/011/A038/A038

11
B

SOURCE: Ref. zh. Vozdushnyy transport. Svodnyy tom, Abs. 11A254

AUTHOR: Luk'yanov, A. A.; Dvoretskiy, K. P.

TITLE: The effect of an exit cone on the slip coefficient of a small centrifugal compressor at hypercritical velocities

CITED SOURCE: Uch. zap. aspirantov i soiskateley. Leningr. politekhn. in-t. Energomashinostroyeniye. L., 1964, 51-56

TOPIC TAGS: centrifugal compressor, slip coefficient, exit cone, hypercritical velocity

TRANSLATION: The authors evolved expressions for calculating variations in the slip coefficient μ in relation to basic design parameters of an exit cone at sub- or hypercritical velocities and to various discharge coefficients. The results obtained by calculations utilizing these expressions coincided closely with experimental data. Ya. Sirotkin.

SUB CODE: PR ENCL: 00

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L 27784-65 EWT(1)/EPA/EMP(f)/EWG(r)/T-2/EPA(bb)-2 Pe-5/Pw-4 WW

ACCESSION NR: AT5003395 S/2563/64/000/232/0099/0105

31
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B+1

AUTHOR: Dvoretskiy, K. P. ; Luk'yanov, A. A.

TITLE: Throttle characteristics of a centrifugal compressor with a vane diffusor

SOURCE: Leningrad. Politekhnicheskiy institut. Trudy, no. 232, 1964. Turbomashiny (Turbomachines), 99-105

TOPIC TAGS: compressor, centrifugal compressor, throttle characteristic, experimental throttle characteristic, low output compressor, vane diffusor

ABSTRACT: Using the known gas-dynamic equations for uniform motion, and the pertinent experimental results, the authors were able to establish an unambiguous relationship between the output G and degree of compression containing the angular speed implicitly through the parameters of the slowed-down flow following the rotor; the relationship takes the form

$$G \approx F_2 \cdot k_f \sqrt{\frac{2k}{k-1} p_{2a} \rho_{2a} \left(\phi \frac{r}{r_2} - \zeta\right)^{\frac{2}{k}} - \left(\phi \frac{r}{r_2} - \zeta\right)^{\frac{k+1}{k}}} \quad (1)$$

where F_2 is the surface of the diffusor neck, k_f - the coefficient of flow contrac-

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tion, ε - degree of stage compression, ε_k - degree of full pressure increase in the rotor ($\varepsilon_k = p_{2n}/p_{1n}$), p_{2n} - full pressure behind the rotor, p_{1n} - full pressure in front of the rotor, ρ_{2n} - density of the slowed-down flow following the wheel, k - isotropy index, and τ and ζ - empirical coefficients. This expression was used for the establishment of the throttle characteristics which were then compared with data from a special test using a low output centrifugal compressor working in the M_u = 0.80-1.1 region. The maximum degree of compression (ε = 2.5-2.7) corresponded to a peripheral velocity of 380 m/sec. The experimental data describing the distribution of the static pressures, output, degree of compression, and relative degrees of compression agree quite well with theoretical curves, the latter being clearly superior (in the low output range) to the previously published theoretical relationships. Orig. art. has: 14 formulas and 8 figures.

ASSOCIATION: Leningradskiy politekhnicheskiy institut imeni M. I. Kalinina (Leningrad polytechnic institute)

SUBMITTED: 00 ENCL: 00 SUB CODE: PR

NO REF SOV: 000 OTHER: 007

Card 2/2

SOKOLOV, S.; ALEKSANDROVA, Ya.; LUK'YANOV, A.

Vsevolod Ivanovich Nazarov, 1894-1965. Koll. zhur. 27 no.4:629 Jl-Ag '65. (MIRA 18:12)

LUK'YANOV, A.B.

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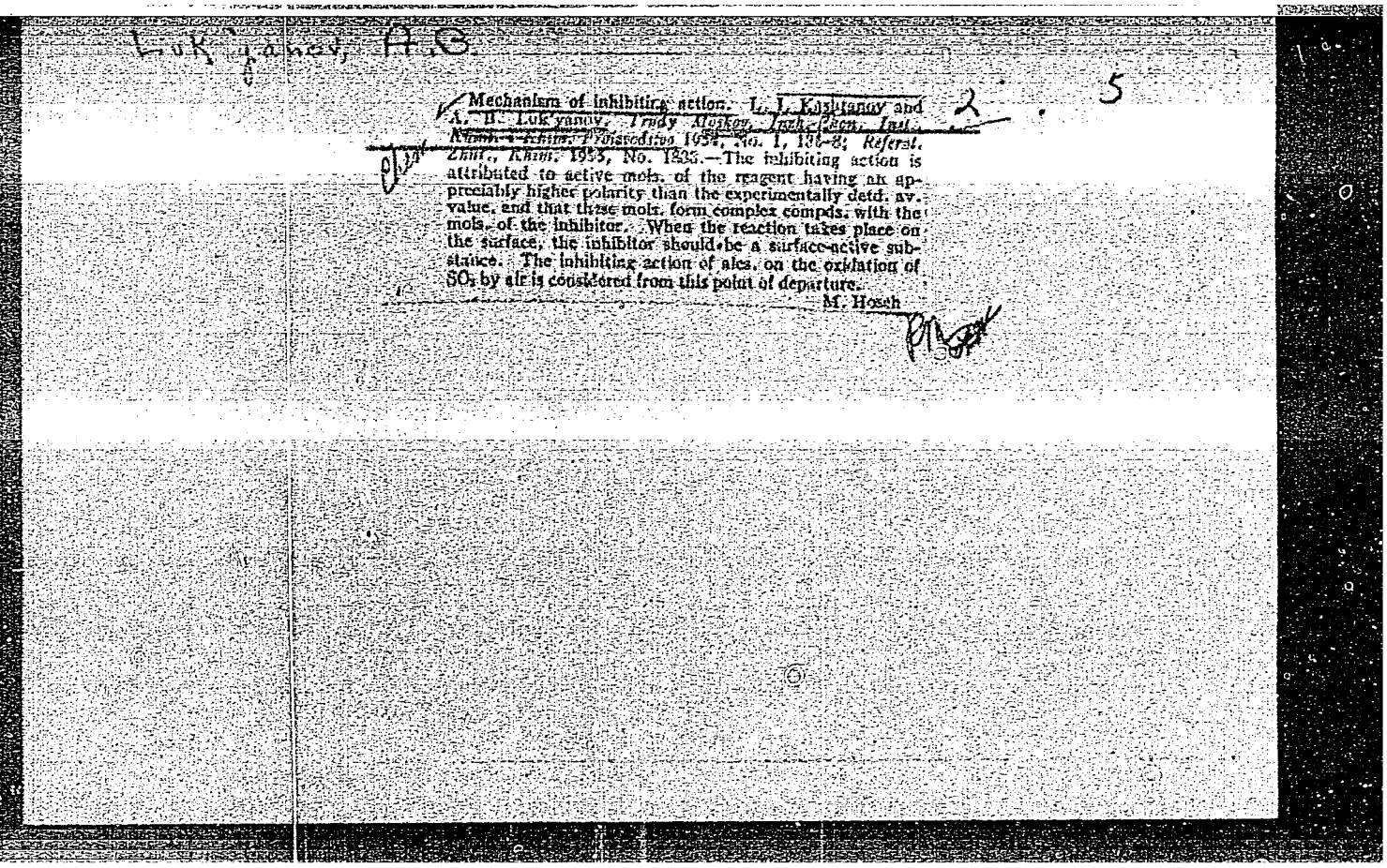
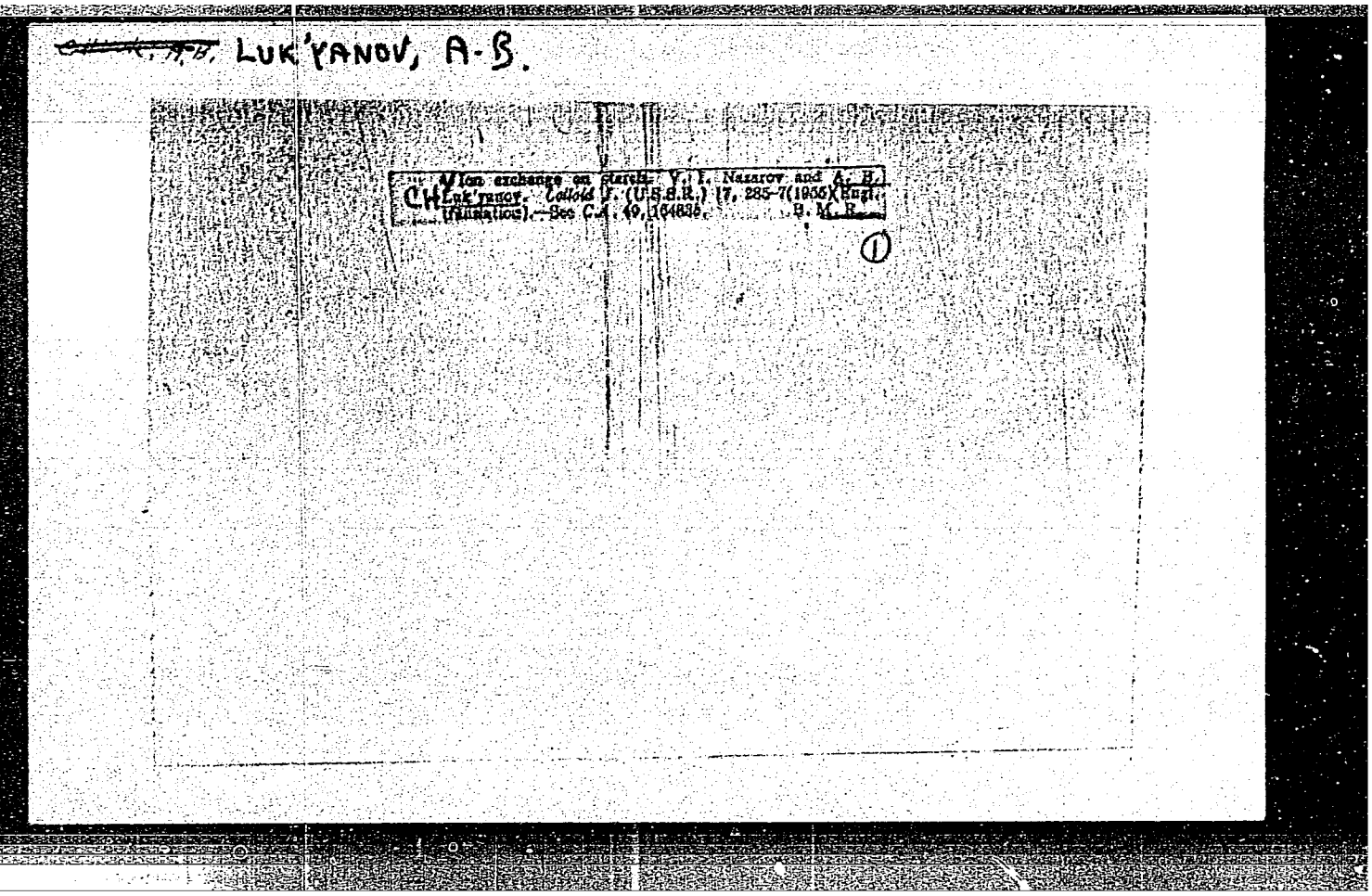
[Introduction to analytical chemistry; theory and formulations] Vvedenie v analiticheskuiu khimiiu; teoreticheskie obosnovaniia i raschety. Moskva, Sovetskaia nauka, 1953. 363 p. (MLRA 7:6)
(Chemistry, Analytical--Study and teaching)



Lukyanov, A.S.

Mechanism of inhibiting action. L. I. Kuzubanov and A. S. Lukyanov. *Trudy Moskov. Inzh.-Ekon. Inst. Khim. i Khim. Tekhnologiya* 1954, No. 1, 196–8; *Referat. Zhur., Khim.* 1955, No. 1235.—The inhibiting action is attributed to active mols. of the reagent having an appreciably higher polarity than the experimentally detd. av. value, and that these mols. form complex compds. with the mols. of the inhibitor. When the reaction takes place on the surface, the inhibitor should be a surface-active substance. The inhibiting action of ales. on the oxidation of SO_2 by air is considered from this point of departure.

M. Hosch



LUK'YANOV, A-B.

Ion exchange on starch. V. I. Nazarov and A. B. Luk'yanov. *Colloid J. (U.S.S.R.)* 17, 285-7(1955)(Engl. translation).—See *C.A.* 49, 16485b. B. M. R.

①

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CH Ion exchange on starch. V. I. Nazarov and A. B. Luk'yanov (Technol. Inst. Food Ind., Moscow). *Kolloid. Zhur.* 17, 372–4(1955).—Potato starch (I) washed with HCl is an ion exchanger. Addn. of NaCl, KCl, or $BaCl_2$ to its suspensions causes an increase in elec. cond. because H^+ ions enter and metal ions leave the soln., while the elec. cond. of KOH and $Ba(OH)_2$ is lowered by I because OH^- ions neutralize the H^+ ions displaced from I. Gelatinized I behaves similarly to a suspension of I. J. J. B.

(1)

VASYUCHENKO, Sofiya Ivanovna; LUK'YANOV, A.B., redaktor; POPRYADUKHIN, K.A., tekhnicheskiy redaktor

[Chemistry for technical schools] Khimiia; dlia tekhnikumov. Moskva, Gos. izd-vo "Sovetskaia nauka," 1956. 302 p. (MLRA 9:9)
(Chemistry)

BARKOV, Sergey Aleksandrovich, dots.; RONZHINA, Nadezhda Mikhaylovna, dots.; LUK'YANOV, A.B., red.; LIPKINA, T.G., red.izd-va; POPRYADUKHIN, K.A., tekhn.red.

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(Chemistry, Analytic--Qualitative)

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(Colloids)

LUK'YANOV, A. D.

33328. O Razmerakh Prom. s'lennykh Vinogradnikov V Kolkhozakh. Sad I Ogorod, 1949, No. 10, C. 37-39

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

POTAPENKO, YA. I., LUKYANOV, A. D., LAZAREVSKIY, M. A., Authors

Potapenko, Ya. I.

"Viticulture," Reviewed by M. A. Grachev, Sad i og., No. 8, 1952.

Monthly List of Russian Accessions, Library of Congress, October 1952. Unclassified.

1. LUK'YANOV, A. D.

2. USSR (600)

4. Virticulture

7. Principles of future planning for viticulture on collective farms. Sad i og. No. 12, 1952.

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

LUK'YANOV, A.D., inzh.; PANKRATOV, N.S., kand. tekhn. nauk; POKAMESTOV, V.V., inzh.

Preparation of the surface of peat fields by the deep milling of stump-containing layers. Torf. prom. 36 no.5:8-11 '59. (MIRA 13:1)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut torfyanoy promyshlennosti. (Peat machinery)

POTAPENKO, Ya.I.; LUK'YANOV, A.D.; LAZAREVSKIY, M.A.; DYUZHEV, P.K.; ZAKHAROVA, Ye.I.; KOVALEV, A.A.; RUZAYEV, K.S.; NECHAYEV, L.E.; BASAN'KO, A.A.; MASHINSKAYA, L.P.; ALIYEV, A.M.; MANOKHIN, P.A.; LITVINOV, P.I.; KOROTKOVA, P.I.; ZAYTSEVA, Yu.F.; GRAMOTENKO, P.M.; TAIROVA, V.N., red.; PROKOF'YEVA, L.N., tekhn.red.

[Viticulture] Vinogradarstvo. Moskva, Gos.izd-vo sel'khoz.lit-ry. 1960. 612 p. (MIRA 14:1)
(Viticulture)

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New method for preparing peat fields. Biul.tekh.-ekon.inform. no.5:8-10 '60. (MIRA 14:3)

(Peat machinery)

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1. Leningrad. Vsesoyuznyy nauchno-issledovatel'skiy institut torfyanoy promyshlennosti. Direktor filiala Vsesoyuznogo nauchno-issledovatel'skogo instituta torfyanoy promyshlennosti (for Pankratov).

(Peat bogs) (Peat machinery)

BADAR'YAN, G.G.; TYUTIN, V.A.; CHEREMUSHKIN, S.D.; ZUZIK, D.T.; KHODASEVICH, B.G.; FRAYER, S.V.; GUSAROV, Ye.I.; KAZANSKIY, A.M.; KASSIROV, L.N.; KARAYEV, S.A.; ARKANOV, V.A.; VASIL'YEV, N.V.; BUGAYEV, N.F.; SAPIL'NIKOV, N.G.; KASTORIN, A.A.; RUDNIKOV, V.N.; YAKOVLEV, V.A.; PEREMYKIN, V.I.; ISAYEV, A.P.; KUZ'MICHEV, N.N.; IL'IN, S.A.; PRONIN, V.A.; LUK'YANOV, A.D.; SHAKHOV, Ya.K.; IL'ICHEV, A.K., kand. sel'-khoz. nauk; KOGAN, A.Ya.; TSYNKOV, M.Yu.; BABIY, L.T.; GORBUNOV, I.I.; KOVALEV, A.M.; ROMANCHENKO, G.R.; BRODSKAYA, M.L., red.; IVANOVA, A.N., red.; GUREVICH, M.M., tekhn. red.; TRUKHINA, O.N., tekhn. red.

[Economics of agriculture]Ekonomika sotsialisticheskogo sel'-skogo khoziaistva; kurs lektsii. Moskva, Sel'khozizdat, 1962. 710 p. (MIRA 15:10)

(Agriculture—Economic aspects)

ALTAYSKIY, I.P., kand. sel'khoz. nauk: CHESHKOV, A.F., kand. ekon. nauk; MALIN, A.S., kand.ekon. nauk [deceased]; BOROVSKIY, V.A., kand. ekon. nauk; AREF'YEV, T.I., kand. ekon. nauk; GLINYANYY, V.G., kand. ekon. nauk; FRAYER, S.V., kand. sel'khoz. nauk; VINTAYKIN, Z.P., kand. ekon. nauk; DUDOROV, I.T., kand. ekon. nauk; BUSAROV, N.A., kand. sel'khoz. nauk; LUK'YANOV, A.D., kand. sel'khoz. nauk; RAKITINA, Ye.D., red.; SOKOLOVA, N.N., tekhn. red.

[Production brigades on collective and state farms] Proizvodstvennye brigady v kolkhozakh i sovkhozakh. Moskva, Sel'khozizdat, 1963. 374 p. (MIRA 17:1)
(Farm management)

POKAMESTOV, V.V.; GLAGOLEV, P.P.; LUK'YANOV, A.D.

Preparation of peat bogs by deep continuous milling. Trudy VNIITP no.21:3-93 '63. (MIRA 17:3)

LUK'YANOV, A.I.

LUK'YANOV, A.I.; BALYABIN, A.Ya.

Working at high speeds. Tekst.prom. 17 no.9:49-50 S '57.
(MIRA 10:11)

1. Glavnyy inzhener fabriki imeni N.K.Krupskoy (for Luk'yanov).
2. Nachal'ni prigotovitel'nogo tsekha fabriki imeni N.K.Krupskoy (for Balyabin).

(Looms)

1. LUK'YANOV, A. K.

2. USSR 600

4. Poplar - Ural River Valley

7. How to store poplar propagation cuttings in the alluvial lands of the Ural River, Les. khoz, 5, No. 12, 1952.

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

YEGOROV, E.A.; MANUYLOV, M.M.; LUK'YANOV, A.K.

Modernized molding machine "International." Lit.proizv. no.2: 43-44 F '60. (MIRA 13:5)
(Foundries--Equipment and supplies)

ZHED', V.P., kand. tekhn. nauk, Prinimali uchastiye: BASS, G.S., inzh.; VOROB'YEV, I.I., kand. tekhn. nauk; YELISAVETSKIY, A.G., inzh.; PAVLOVA, M.A., st. inzh.; SHEYNBERG, S.A., doktor tekhn. nauk; LUK'YANOV, A.K., red.; VIKTOROVA, Z.N., tekhn. nauk

[Units and mechanisms of machine tools; survey of foreign design] Uzly i mekhanizmy metallorezhushchikh stankov; obzor zarubezhnykh konstruktsii. Moskva, TSentr. in-t nauchno-tekhn. informatsii, 1961. 53 p. (MIRA 14:11)
(Machine tools--Design and construction)

MERPERT, M.P., kand.tekhn. nauk; ROZENBAUM, B.S., red.; LUK'YANOV, A.K., red.; VIKTOROVA, Z.N., tekhn. red.

[Development of structural elements of grinding machines abroad] Razvitie elementov konstruktsii shlifoval'nykh stankov za rubezhom; obzor. Moskva, 1961. 67 p. (MIRA 16:4)

1. Moscow. TSentral'nyy institut nauchno-tekhnicheskoy informatsii mashinostroyeniya.
(Grinding machines—Technological innovations)
(Automation)

LEVIN, M.M.; AVDULOV, A.N.; ROZENBAUM, B.S., red.; LUK'YANOV, A.K., red.; KOGAN, F.L., tekhn. red.; ALEKSEYEVA, T.V., tekhn. red.

[New instruments for measuring angular and linear values in the manufacture of machinery abroad] Novye pribory dlia kontrolia uglovykh i lineinykh velichin v zarubezhnom mashinostroenii; obzor. Moskva, 1961. 105 p. (MIRA 14:11)

1. TSentral'nyy institut nauchno-tekhnicheskoy informatsii mashinostroyeniya.
(Machinery industry) (Measuring instruments)

MARDANYAN, M.Ye., laureat Stalinskoy premii; GONCHAROVA, S.L., red.; LUK'YANOV, A.K., red.; KOVAL'SKAYA, I.F., tekhn. red.; VIKTOROVA, Z.N., tekhn. red.

[Characteristics of the manufacture of machine tools by certain swiss companies] Osobennosti proizvodstva stankov nekotorykh shveitsarskikh firm; obzor. Moskva, TsINTIMASh, 1961. 46 p. (MIRA 16:6)

(Switzerland—Machine-tool industry)

LUK'YANOV, A.M.

Calculation of flat massive frames. Nauch.-tekh.inform.biul. LPI no.1/2:163-171 '58. (MIRA 12:6)
(Structural frames)

LUK'YANOV, A.N., gornyy inzh.

Improving boring operations at the Olenegorsk Combine strip mine. (MIRA 18:2)
Gor. zhur. no.11:36-38 N '64.

L 4095-66 EWT(1)/EWA(h)

ACC NR: AP5024985 SOURCE CODE: UR/0286/65/000/016/0046/0046

29
13

INVENTOR: Ivanitskiy, K. P.; Luk'yanov, A. N.; Itkin, N. I.

ORG: none

TITLE: Device for measuring the Q-factor of shf resonators. Class 21, No. 173810 /announced by State Committee on Radioelectronics SSSR (Gosudarstvennyy komitet po radioelektronike SSSR)/

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 46

TOPIC TAGS: measuring instrument, resonator Q factor, resonator, superhigh frequency

ABSTRACT: This Author Certificate introduces a device for measuring the Q-factor of shf resonators. It consists of an FM generator, an AM detector, a switch, a comparison unit, a cathode-ray indicator, and a pointer-type indicator. In order to increase the measurement accuracy, the switch and the comparison unit are connected at their inputs with the resonator through a signal amplifier and with a reference voltage source. The cathode ray indicator is connected to the output of the switch, and the printer-type indicator, to the output of the comparison unit. Orig. art. has: 1 figure. [JR]

SUB CODE: EC/ SUBM DATE: 29Jun63/ ORIG REF: 000/ OTH REF: 000/ ATD PRESS: 4/29

BVK

Card 1/1 UDC: 621.317.337

L 13694-66 EWT(1)/EEC(k)-2/EWA(h)

ACC NR: AP6002875 SOURCE CODE: UR/0286/65/000/024/0037/0037

INVENTOR: Ivanitskiy, K. P.; Itkin, N. I.; Luk'yanov, A. N.

ORG: none

TITLE: Device for measuring ultrahigh Q factors. Class 21, No. 176961 [announced by the Establishment of the State Committee on Electronic Engineering SSSR (Predpriyatiye gosudarstvennogo komiteta po elektronnoy tekhnike SSSR)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 37

TOPIC TAGS: Q meters, rf resonator

ABSTRACT: The Author Certificate introduces a device for measuring ultrahigh Q's of rf resonators by reading the resonance time of a postimpact excitation. The device consists of an FM generator, a measuring resonator, a detector, a video amplifier, and a unit for separating the exponentially decaying part of a signal and measuring its duration. To exclude the effects of both frequency instabilities and FM generator output on measurements, an AM discriminator is employed. The input of the discriminator is coupled to the video amplifier output, while its output is coupled to a monovibrator generating negative pulses which are imposed on a sweeping sawtooth voltage in a summator. Orig. art. has: 1 figure. [JR]

SUB CODE: 09/ SUBM DATE: 24Dec64/ ATD PRESS: 4187

Card 1/1 UDC: 621.317.737

L 07213-67 EWT(d)/EWP(c)/EWP(v)/EWP(k)/EWP(h)/EWP(l)
ACC NR: AP6028699 SOURCE CODE: UR/0410/66/000/003/0101/0112

47
B

AUTHOR: Luk'yanov, A. N. (Moscow); Frolov, M. V. (Moscow)

ORG: none

TITLE: Investigation of signals of the state of an operator

SOURCE: Avtometriya, no. 3, 1966, 101-112

TOPIC TAGS: man machine ~~relation~~ communication, statistic analysis, man operator, cybernetics

14

ABSTRACT: In order to raise the effectiveness of the operations of a man-machine system, the present authors propose a block diagram with control of the functional state of man-operator (Figs. 1 and 2). The α and η processes correlated, correspondingly, with the state of attention and the state of emotional stress, may be used in the control system of the functional states of man. Quantitative values of the coefficients of difference have been obtained for the processes α and η of the states of attention and emotional stress from the state of the "operative rest." On the basis of experimental data obtainted, the statistical problem of the detection of signals of emotional stress and the attention state of the operation is solved. Orig. art. has: 25 formulas, 1 table, and 7 figures. [26]

UDC: 62—506.2

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L 07213-67

ACC NR: AP6028699

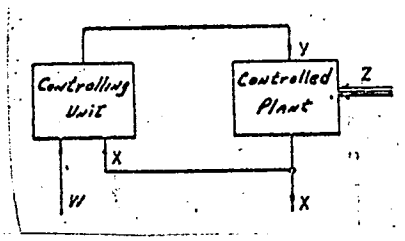

Fig. 1. Block diagram of man-operator system

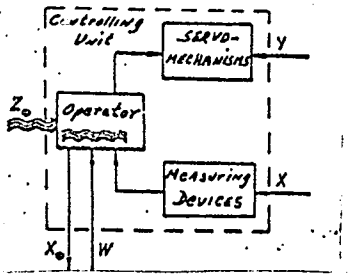

Fig. 2. Block diagram of man-operator system

SUB CODE: 05/ 06/ SUBM DATE: 14Oct65/ ORIG REF: 016/ OTH REF: 007

Card 2/2

LUK'YANOV, A.P.; MOLYUKOV, I.D.

Solution of problems of the equilibrium threshold of loose materials by the mathematical modeling method. Osn., fund. i mekh. grun. 7 no. 6:9-11 '65. (MIRA 18:12)

26365
S/089/61/011/002/001/015
B102/B201

26.2240
21.2500

AUTHORS: Volkov, V. S., Luk'yanov, A. S., Chepkunov, V. V., Shevyakov, V. P., Yamnikov, V. S.

TITLE: Use of fissile absorbers in nuclear reactors

PERIODICAL: Atomnaya energiya, v. 11, no. 2, 1961, 109-121

TEXT: The present article gives a survey of usefulness and purpose of the use of fissile absorbers in reactors. Introducing fissile absorbers into the core is one of the possible methods of compensating for the initial reactivity excess. For technological and chemical reasons, only few elements are eligible as absorbers of this kind: boron, hafnium, europium, gadolinium, samarium, cadmium, and mercury. Data on these fissile absorbers are compiled in a table taken from Ref. 1 (Nucl. Sci. and Engng., 4, No. 3, 357 (1958)). Experience and investigation results gained in the USA in various reactors are dealt with. Apart from reports made at the Second Geneva Atomic Conference (1958) (Papers nos. 455, 1017), the material concerned was taken exclusively from American publications: Nucl. Engng. 4, No. 34, 11 (1959), Nucleonics, 16, No. 1, 100, 102 (1958). The various

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Use of fissile absorbers in ...

technical and design problems involved in the use of fissile absorbers are now discussed. These problems include the exact dosing of the absorber, its resistance to corrosion, taking account of the change in mechanical properties of absorbers while in operation; use of boron leads to the formation of Li and He, which must also be taken into account; additional difficulties arise with fuel regeneration. The remaining problems are of a purely technical nature, such as a removal of heat produced in absorbers. In most cases, boron is used in the form of alloys or chemical compounds, dispersed in some materials. The properties of boron in stainless steels and boron-titanium alloy (1.75% by weight of B^{10}) have repeatedly been studied (Nucl. Sci. Engng. 4, No. 3, 386, 402, 415 (1958)). Irradiating an alloy containing boron (0.56% by weight of B^{10}) reduces its plasticity considerably: to half its value with an integral flux of $1.35 \cdot 10^{10}$ n/cm^2, and to one-fifth at $5.87 \cdot 10^{20}$ n/cm^2. The volume of boron-titanium alloys increases up to 4.3%, depending on burn-up and boron content. Similar conditions are found for boron-zirconium alloys (Nucl. Sci. and Engng. 6, no. 3, 1967 (1959); Reactor core materials, 2, no. 1, 26 (1959)). Neutron capture in the absorber plays the principal role in a theoretical treatment of reactors using fissile absorbers. For the case of only thermal neutrons

Use of fissile absorbers in ...

being absorbed, some relations are presented, which were taken from lectures by A. Radkowsky, J. Stewart, and P. Zweifel at the Second Geneva Atomic Conference (1958) [Abstracter's note: The numbers of the papers are not given.] Various fuel and absorber distributions in the core are discussed briefly. Finally, German investigations (Von Winkel et al. Atomenergie, 4, 3, 93 (1959)) are dealt with (Study of the linear radial distribution of an absorber, and its distribution according to a Bessel function). It is finally stated that the use of fissile absorbers still meets with certain difficulties which, however, can probably be overcome. There are 7 figures, 11 tables, and 18 references: 4 Soviet-bloc and 14 non-Soviet-bloc. The most important references to English-language publications are all mentioned in the abstract.

SUBMITTED: October 8, 1960

Card 3/3

Luk'yanov, A.T.

PHASE I BOOK EXPLOITATION SOV/3537

Akademiya nauk Kazakhskoy SSR. Institut khimicheskikh nauk

Trudy, t. 5 (Transactions of the Institute of Chemical Sciences, Kazakh SSR, Academy of Sciences, Vol 5) Alma-Ata, Izd-vo Akademii nauk Kazakhskoy SSR, 1959. 154 p. 1,000 copies printed.

Ed.: N.D. Zhukova; Tech. Ed.: Z.P. Rorokina; Editorial Board of Series: D.V. Sokol'skiy (Resp. Ed.), V.G. Gutsalyuk, and B.V. Suvorov (Resp. Secretary).

PURPOSE: This collection of articles is intended for personnel of scientific research laboratories, laboratories of industrial enterprises, and faculty members of schools of higher education.

COVERAGE: The collection reviews problems of liquid-phase catalytic hydrogenation to upgrade and reactivate various products. Hydrogenation of unsaturated bonds of various types, adsorption of hydrogen on different catalysts, chromatographic separation of mixtures, and the effect of halogen salts of alkali metals on the rate of hydrogenation reactions promoted by various skeleton catalysts are described. Conditions of catalytic hydrogenation of natural fat, sunflower oil, and such synthetic products as esters of high-molecular fatty acids are set out. Dehydration of the butane fraction carried out in combination with isomerization is analyzed. Principles of selecting catalysts and regenerating them are reviewed and the formation of adsorption potentials on metal catalysts is explained. Each article presents conclusions drawn on the basis of experimental findings. References accompany most of the articles.

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S/194/61/000/009/011/053
D222/D302

9,7000

AUTHORS: Vulis, L.A. and Luk'yanov, A.T.

TITLE: Electrostatic integrator

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 9, 1961, 15, abstract 9 B100 (V sb. Issled. protsessov perenosa. - Vopr. teorii otnositel'nosti, Alma-Ata, 1959, 65-88)

TEXT: The operating principles of an integrator intended for solving partial differential equations of the heat conduction type are described. The main operating part is a collection of capacitors which imitate a discrete (finite-difference) representation of the problem. For this purpose a definite number of elements form part of the integrator, each of them corresponding to a certain part of the physical system investigated. An element consists of two series connected capacitors which are in turn connected to adjacent capacitors; one switching cycle corresponds to one unit of

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S/194/61/000/009/011/053
D222/D302

Electrostatic integrator

time interval. The system provides for the specification of sources, and for solving problems with variable coefficients. The theoretical circuit diagram of the device, containing in addition to the capacitor a switch, stabilized supplies and measuring instruments, is described. Examples show how the problem of cooling plates is solved. 11 figures. 2 tables. 11 references. [Abstracter's note: Complete translation]

B

Card 2/2

LUKYANOV, A. T.

PHASE I BOOK EXPLOITATION SOV/5179

Alma-Ata, Kazakhstan. Universitet.

Issledovaniye protsessov perenosa. Voprosy teorii otnositel'nosti (Study of Transfer Processes. Problems in the Theory of Relativity) Alma-Ata, 1959. 236 p. Errata slip inserted. 1,000 copies printed. (Series: Its Trudy)

Sponsoring Agency: Ministerstvo vysshego obrazovaniya SSSR and Kazakhskiy gosudarstvennyy universitet im. S.M. Kirova.

Editorial Board: V.P. Kashkarov, N.D. Kosov, and N.M. Petrova; Resp. Ed.: L.A. Vulis; Tech. Ed.: L.D. Kashkarov.

PURPOSE: This collection of articles is intended for research physicists and engineers. It can also be used by instructors and students at universities.

COVERAGE: The articles of this collection contain the results of 19 studies in transport problems and the general theory of relativity made from 1956 to 1958 by the staff of the kafedra obshchey fiziki i teoreticheskoy fiziki Kazakhskogo universiteta im. S.M. Kirova (Department of General Physics and Theoretical

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Study of Transfer Processes (Cont.) SOV/5179

Physics of the S.M. Kirov Kazakh State University). The articles are arranged in two groups. Group one contains 16 articles concerning the research activity of the teplofizicheskaya laboratoriya pri kafedre obshchey fiziki (Heat Physics Laboratory of the Department of General Physics) in the investigation of transport processes of matter, impulse and energy; group two contains three articles reporting on studies of the Department of Theoretical Physics on problems of the theory of relativity. Article one of the collection is an introduction and reviews the problems of transport processes and gives a fairly detailed bibliography of contributions of members of physics department of Kazakh State University. No personalities are mentioned. References accompany each article.

TABLE OF CONTENTS:

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Study of Transfer Processes (Cont.)

67148
SOV/31-59-9-8/21

~~28(2)~~ 16.6800

AUTHORS: Vulis, L.A., Isayev, N.U., and Luk'yanov, A.T.

TITLE: Static Analog Devices

PERIODICAL: Vestnik Akademii nauk KazSSR, 1959, Nr 9, pp 53-58 (USSR)

ABSTRACT: The article deals with an entirely new type of analogs, the static electrointegrators (SEI). Having been under development at the Problemnaya teplofizicheskaya laboratoriya Kazakhskogo universiteta (Laboratory for Thermal and Physical Problems of the Kazakh University) since 1957, they greatly simplify the computing methods and at the same time widen the scope of problems to be investigated. The static electrointegrators have already been used for computing diffusion of neutrons as well as for solving nonlinear problems pertaining to the theories of heat conductivity and hydrodynamics (Figure 2). The article also mentions two additonal SEI models.

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Static Analog Devices

the first being practically an electric analog of D. V. Budrin's hydrostatic integrator and the second an SEI with an ohmic-type, moving computor device (Figures 3 and 4). The latter has a great advantage as it can make calculations by dividing the space-time component into as many elements as desired. In addition to this, the SEI with an ohmic-type moving computor device has small dimensions, its only bad point being the necessity to make intermediate entries. The article also mentions the Problemnaya laboratoriya kafedry obshchey fiziki Kazakhskogo universiteta (Problem Laboratory of the General Physics Faculty of the Kazakh University). There is 1 graph, 1 set of graphs, 1 set of hookups, 1 photograph, and 12 references, of which 2 are American and 10 Soviet.

Card 2/2

LUK'YANOV, A. T., Cand Phys-Math Sci -- (diss) "Statistical, electrical integration for the solution of differential equations of mathematical physics." Alma-Ata, 1960. 12 pp with diagrams; (Committee of Higher and Secondary Specialist Education under the Council of Ministers Kazakh SSR, Kazakhstan State Univ im S. M. Kirov, Physics Faculty); 200 copies; price not given; (KL, 17-60, 139)

SOV/31-60-2-20/25

AUTHOR: Luk'yanov, A.T.

TITLE: The Application of Physical and Mathematical Modelling Methods

PERIODICAL: Vestnik Akademii nauk Kazakhskoy SSR, 1960, Nr 2, p 104 (USSR)

ABSTRACT: A conference on the application of physical modelling in electrotechnical problems and on electrical methods of mathematical modelling was held in Moscow. M.P. Kostenko, Academician of the AN SSSR (AS USSR), opened the conference, at which about 70 reports were heard. Professor V.A. Venikov (MEI), Lenin Prize Laureate, and Docent I.M. Tetel'baum (MEI) gave a report entitled "Analysis and Experiment, Modelling and Cybernetics in Engineering Practice". Reports by scientists from Moscow and Leningrad, the Latviyskaya, Armyanskaya, Gruzinskaya, Ukrainskaya and Kazakhskaya SSR's, were heard. The Kazakhskiy gosudarstvennyy universitet (Kazakh State

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The Application of Physical and Mathematical Modelling Methods

University) gave 4 reports on the work of the Problemnaya teplofizicheskaya laboratorya (Problematical Thermophysics Laboratory) attached to the Kafedra obshchey fiziki (Chair of General Physics) under Professor L.A. Vulis. The application of modelling methods in solving non-linear equations for heat conductivity, hydrodynamics and the diffusion theory of neutron transfer was discussed. The construction and theory of new integrators, known as electrostatic integrators, which have been made in the laboratory, were described in detail.

ISAYEV, N.U.; LUK'YANOV, A.T.

Experiment of simulating the critical state of muclear reactors by means of static electrointegrators. Izv. AN Kazakh.SSR Ser.energ. no.2:122-129 '60. (MIRA 13:7)

(Nuclear reactors--Electromechanical analogies)

LUK'YANOV, A. T., VULIS, L. A., and ZHEREBYAT'EV, I. F.

"Solution of Non-linear Equations of Thermal Conductivity by Static Electrical Integrators."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, JUNE 1961.

S/031/61/000/001/003/003
A161/A129

AUTHOR: Luk'yanov, A.T., Candidate of Technical Sciences

TITLE: Investigation of catalytic exothermic reactions on channel walls

PERIODICAL: Vestnik Akademii nauk Kazakhskoy SSR, no. 1, 1961, 84-88

TEXT: The article presents a description of an experimental installation for measurements of local temperature in reaction surfaces and heat transfer through the channel walls, and an attempt to reduce as far as possible the heat transfer along the walls. The problem of heat in separate reaction zones is studied in connection with theoretical studies of heterogeneous combustion in general and of temperature of the reaction gas and the solid phase surface in the reaction zone in particular. Other authors studied the problem previously using a carbon channel, but without satisfactory results in view of the carbon properties (burning out, covering with ash, cracking, and being heat conductive). The channel (Fig. 1 and 2) is assembled from 150 copper rings with an inner diameter of 6 mm, an outer diameter of 14 mm and a height of 1 mm. A copper-

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Investigation of catalytic ...

constantan thermocouple is welded into each ring close to the inner surface. The ring set is tied together with bolts to make joints tight. Electric heating is provided for initiating the reaction. Cold thermocouple junctions with copper heads are coated with bakelite varnish and put into a chamber with circulating water with 20°C. The chamber space is filled out with Wood alloy ensuring heat contact. Air fed into the reaction channel was preliminarily purified from CO_2 on the way through three jars with liquid and solid NaOH. Gas flow rate was measured with a capillary flow meter. Then, air was heated to 100°C and enriched with methyl alcohol. Then the reaction gas mixture was fed into the channel with walls preheated to 300°C. Outer heating was switched off after beginning of the oxidation process. The wall temperature readings were taken after the process became stable. Samples were taken at the same time for analysis for formaldehyde, CO_2, CO and H in the common process. Heat transfer from heated air to the channel walls was studied in one series of experiments, and from heated walls to moving air in another series. The results were processed as usual. The determined dependence of the Nusselt number on the Reynolds number Nu = f (Re) is shown (Fig. 3),

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Investigation of catalytic ...

where $Nu = \frac{\alpha d}{\lambda}$, and $Re = \frac{vd}{\nu}$ (α is the heat transfer factor; λ - the heat conductivity factor; v - the flow rate; ν - the kinematic viscosity, and d - the characteristic dimension). It can be presented in the empirical formula

$$Nu = 0.12\ Re^{0.65}.$$

The dependence is stronger than usual for this range of Re values (200 - 900), but the absolute Nu number values are close to the known values (Ref. 5, Kutateladze, S.S. and Borishanskiy, V.M. "Handbook of Heat Transfer", Gosenergoizdat, Moscow-Leningrad, 1959). The peculiar catalytic channel surface may be the cause of the slight difference. As said above, the first investigation object was the oxidation reaction of the stoichiometric mixture of methyl alcohol vapor with air. It has two complex stages: 1) oxidation of methyl alcohol to formaldehyde (heat effect $\approx$ 120 cal per gram of stoichiometric mixture) and 2) burning of CH_2O to CO_2 and H_2O (heat effect $\approx$ 450 cal per gram of primary mixture.) The first is a heterogeneous reaction on a copper catalyst, the second is predominantly a volume reaction (at temperatures created by primary oxidation of alcohol). Thus the chosen reaction (apart from technological

interest) presents a model of carbon combustion. The results (Fig. 4) are not considered complete and final, but show that the chosen investigation method is correct. The reaction heat calculation results in the first stage are in agreement with the experimental data. The heat transfer through the wall was comparatively small. A more accurate determination of local heat flow through the channel walls will be carried out in future experiments. An approximate calculation of effective zone length for diffusion combustion was made. The result was ≈ 3 cm, which is close to the experimental value ($\approx$ = 2 cm). The calculation details are not included. The investigation was carried out under supervision of L.A. Vulis. There are 4 figures and 6 Soviet bloc references.

Card 4/4

VULIS, L.A.; YERAKHTIN, B.M.; INYUSHIN, M.V.; LUK'YANOV, A.T.

Calculation of thermal conditions of a concrete dam for the selection of efficient methods of construction work. Inzh.-fiz.zhur. 6 no.10:3-8 O '63. (MIRA 16:11)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova, Alma-Ata.

BEZVERKHOVA, S.T.; LUK'YANOV, A.T.; SOKOL'SKIY, D.V., akademik

Potentiometric measurements in various media. Dokl.AN SSSR 148 no.4:881-883 F '63. (MIRA 16:4)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Korova.
2. AN KazSSR (for Sokol'skiy).
(Conductometric analysis)

LUK'YANOV, A.T.; SHARAYA, S.N. (Alma-Ata)

"Solution of boundary layer problems on statical models".

report presented at the 2nd All-Union Congress of Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

LUK'YANOV, A.T. ; MOLYUKOV, I.D. (Alma-Ata)

"Solution of problems of limit equilibrium of loose media by electrical analogy".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

IBRAGIMOV,I.I.;KASHKAROV,V.P.;LUK'YANOV,A.T. (Alma-Ata)

"The boundary layer on a moving continous flat surface"

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

KASHKAROV,V.P.;LUK'YANOV,A.T. (Alma-Ata)

"The flow of a variable-viscosity liquid past a plate".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan- 5 Feb 64.

ZHEREBYATEV, I. F.; LUKYANOV, A. T.; RYKOVA, N. P.

"The mathematical simulation of nonlinear parabolic-type equations."

report submitted for 2nd All-Union Conf on Heat & Mass Transfer, Minsk, 4-12 May 1964.

Kazakh State Univ im S.M. Kirov.

L 23605-65 EWT(d)/T/EWP(1) Pg-4 IJP(c) MLX
ACCESSION NR: AT5002501 S/0000/64/000/000/0150/0157

13
B+1

AUTHOR: Luk'yanov, A.T.

TITLE: Implementing various finite difference approximations with the aid of static electrointegrators

SOURCE: Analogovyye metody i sredstva resheniya krayevykh zadach (Analog methods and means of solving boundary value problems); trudy Vsesoyuznogo soveshchaniya, Moskva, 1962 g. Kiev, Naukovadumka, 1964, 150-157

TOPIC TAGS: electrointegrator, electrosimulation, analog computer, finite difference method, approximation, numerical analysis, static integrator

ABSTRACT: The paper considers various (known) finite difference approximations to the solutions of certain standard problems expressed in terms of partial differential equations, and describes the calculational components necessary in order to build an electro-

integrator for implementing the algorithm. Three types of problems are considered:

1. The heat equation

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}; \quad 0 < x < 1, \quad 0 < t < T. \tag{1}$$

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ACCESSION NR: AT5002501

2. the heat equation for a region of space bounded by a hexagonal or triangular net (a special case of (1)), and the wave equation

$$\frac{1}{a}\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}. \qquad (2)$$

$$u(0, t) = F(t), \quad u(x, 0) = f(x),$$

$$u(l, t) = \Phi(t), \quad \frac{\partial u}{\partial x}(x, 0) = \varphi(x).$$

The electro-integrator elements considered should lead to various design changes in presently built electro-integrators. Orig art. has: 5 figures and 20 formulas.

ASSOCIATION: none

SUBMITTED: 05Sep64 ENCL: 00 SUB CODE: MA, DP

NO REF SOV: 005 OTHER: 001

Card 2/2

L 41148-65 EWT(1)/EPF(c)/EPF(n)-2/EWG(m)/EPR Pr-4/Ps-4/Pu-4 WW/GS
ACCESSION NR: AT5002502 S/0000/64/000/000/0158/0165

26
BH
21

AUTHOR: Vulis, L.A.; Zherebyat'yev, I.F.; Luk'yanov, A.T.

TITLE: Static electro-integrators and the solution, with their help, of heat transfer equations in the presence of phase transitions

SOURCE: Analogovyye metody i sredstva resheniya krayevykh zadach (Analog methods and means of solving boundary value problems); trudy Vsesoyuznogo soveshchaniya, Moskva, 1962 g. Kiev, Naukova dumka, 1964, 158-165

TOPIC TAGS: integrator, electrointegrator, static integrator, heat transfer, electrosimulation, analog computer

ABSTRACT: The paper considers a heat transfer problem in the presence of various phase transitions. The problem is to determine the speed of movement of the boundary of the phase transition and the distribution of temperature in the body, considered as a function of time. The problem is expressed mathematically in the form of the non-linear, partial differential equations

$$\frac{\partial u_1}{\partial t} = a_1 \frac{\partial^2 u_1}{\partial x^2}, \quad 0 < x < \xi, \tag{1}$$

$$\frac{\partial u_2}{\partial t} = a_2 \frac{\partial^2 u_2}{\partial x^2}, \quad \xi < x < l, \tag{2}$$

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ACCESSION NR: AT5002502

$$\lambda_1 \frac{\partial u_1}{\partial x} - \lambda_2 \frac{\partial u_2}{\partial x} = \varrho L \frac{d\xi}{dt}, \quad (3)$$

$$u_1(0, t) = u(t),$$

$$u_1(\xi, t) = u_2(\xi, t) = u_m, \quad (4)$$

$$u(x, 0) = f(x).$$

The author constructs an integrator element, shown in Fig. 1 of the Enclosure, which implements the finite difference scheme

$$\frac{V_{k-1,l} - V_{k,l+\Delta l}}{R_{k-1}} + \frac{V_{k,l} - V_{k,l+\Delta l}}{R_k} + \frac{V_{k+1,l} - V_{k,l+\Delta l}}{R_{k+1}} = 0, \quad (5)$$

for the solution of (1) — (4). Several numerical solutions using the described technique are presented. Orig. art. has: 4 figures and 12 formulas.

ASSOCIATION: none

SUBMITTED: 05Sep64 ENCL: 01 SUB CODE: DP, TD

NO REF SOV: 007 OTHER: 002

Card 2/3

L 23586-65 EWT(l)/EWP(m)/EPF(n)-2/EWA(d) Pd-1/Pu-4 WW

ACCESSION NR: AP5002874 S/0207/64/000/005/0132/0134

AUTHORS: Kashkarov, V. P. (Alma-Ata); Luk'yanov, A. T. (Alma-Ata)

TITLE: Flow around a plate by a trickling liquid with variable viscosity

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1964, 132-134

TOPIC TAGS: liquid flow, flow around flat plate, boundary layer flow, boundary layer velocity

ABSTRACT: The solution of the system of equations for the boundary layer of a liquid with variable viscosity flowing in a uniform current around a plate is considered. The system of equations in dimensionless variables is of the form

$$u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}=\frac{\partial}{\partial y}\left[\nu\frac{\partial u}{\partial y}\right],\quad \frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0,\quad u\frac{\partial\theta}{\partial x}+v\frac{\partial\theta}{\partial y}=\frac{1}{P}\frac{\partial^2\theta}{\partial y^2},$$

where P is the Prandtl number, with the boundary conditions

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$u=0,\ v=0,\ \theta=0$ for $y=0$; $u=1,\ \theta=1$ for $y=\infty$

$$\left(u=\frac{U}{U_\infty},\ v=\frac{V}{U_\infty},\ \theta=\frac{T-T_w}{T_\infty-T_w},\ x=\frac{X}{L},\ y=\frac{X}{L},\ L=\frac{\nu_0}{\nu_\infty},\ \nu=\frac{\nu_\infty}{U_\infty},\ P=\frac{\nu_\infty}{d}\right).$$

The initial differential equations are converted to a system of nonlinear finite-difference equations. Their solution can be obtained with the use of static electric integrators whose construction and method of operation are discussed in detail. The solutions for the velocities in the boundary layer along the plate are shown graphically for several particular cases. Orig. art. has: 42 equations and 5 diagrams.

ASSOCIATION: none

SUBMITTED: 01Apr64 ENCL: 00 SUB CODE: ME

NO REF SOV: 004 OTHER: 001

Card 2/2

L 10634-65 EWT(1)/EPF(c)/EPF(n)-2/EPR/T/EPA(bb)-2/EWA(1) Pr-4/Ps-4/Pu-4
ESD(dp)/ASD(d)/AFTC(b)/AFTC(p)/AFWL/AFMD(p)/ESD/AFETR/SSD/AFMDC/ASD(a)-5/RAEM(t)
ACCESSION NR: AP4041073 S/0170/64/000/006/0102/0107

AUTHORS: Zhersbyat'yev, I. F.; Luk'yanov, A. T.

TITLE: Solution of unsteady state heat transfer problem with phase transitions and temperature dependence of coefficients

SOURCE: Inzhenerno-fizicheskiy zhurnal, no. 6, 1964, 102-107

TOPIC TAGS: thermal conductivity, phase transition, temperature field, analog computer, thermal flow

ABSTRACT: The temperature distribution of an infinite slab of thickness l under a prescribed heat input q(t) is investigated. The back side of the plate is assumed insulated. The phase transitions are described by means of coordinates $\xi_1(t)$ at the gas-liquid interface and by $\xi_2(t)$ at the liquid-solid interface. The nonlinear heat flow equations are solved on an analog computer with the assumption that λ(coefficient of thermal conductivity) and c(specific heat) depend on the temperature. Various power law dependences are assumed. The calculations are presented graphically. The results show that the temperature dependence of λ and c increases as the slab melts and becomes critical upon evaporation. The

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ACCESSION NR: AP4041073

largest temperature rise is observed when λ is assumed given by $1-0.73 \times 10^{-7} U^2$ (U - temperature). The best results are obtained assuming maximum values of λ and a(temperature conductivity coefficient) in each phase. Orig. art. has: 2 figures, 1 table, and 12 formulas.

ASSOCIATION: Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova, g. Alma-Ata (Kazakh State University)

SUBMITTED: 26Feb63 ENCL: 00

SUB CODE: TD NO REF SOV: 006 OTHER: 000

Card 2/2

ZHEREBYAT'YEV, I.F.; LUK'YANOV, A.T.

Solution of nonsteady-state heat conduction problems with phase transitions and temperature-dependent coefficients. Inzh. fiz. zhur. 7 no.6:102-107 '64. (MIRA 17:12)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M. Kirova, g. Alma-Ata.

L 38566-65 EWT(1)/EWP(m)/EPR/FCS(k)/EWA(1) Pd-1/Pi-4 WW

ACCESSION NR: AP5007984 S/0031/65/000/002/0063/0069

39
B

AUTHORS: Luk'yanov, A. T.; Sharaya, S. N.

TITLE: Solution of boundary layer problems on static models

SOURCE: AN KazSSR. Vestnik, no. 2, 1965, 63-69

TOPIC TAGS: analog computer, analog system, finite differences method, flow analysis, flow around flat plate, boundary layer, velocity profile

ABSTRACT: The authors have discussed an analog integrator model for solving boundary layer problems and other nonlinear systems. The analog model functions upon the principle of finite difference approximation of the fundamental differential equations. The integrator unit, consisting of several high-resolution functional potentiometers, is shown in Fig. 1 on the Enclosure. Examples of the use of the analog device are given. The first problem solved was the set of equations

$$u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}=U\frac{dU}{dx}+\nu\frac{\partial^2 u}{\partial y^2},$$

$$\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0,$$

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describing the laminar boundary layer around a flat plate of infinite length. The plate is set along an axis x, and the flow is that of a viscous incompressible fluid. Boundary conditions taken are

$$u = v = 0 \text{ for } y = 0,$$

$$u = 1 \text{ for } y \to \infty.$$

The system may be reduced to the finite difference form

$$\frac{u_{n,k+1}-u_{n,k}}{\Delta x} = \frac{\nu}{(\Delta y)^2}\,\frac{1}{a}\sum_{i=1}^{a}\frac{1}{u_i}\left(u_{n-1,k}-2u_{n,k}+u_{n+1,k}\right)-$$

$$-\frac{1}{b}\sum_{i=1}^{b}\frac{v_i}{u_i}\,\frac{1}{2\Delta y}\left(u_{n-1,k}-u_{n+1,k}\right),$$

$$v_{n,k+1} = v_{n,k} + u_{n,k} - u_{n,k+1},$$

$$a = \frac{u_{n,k+1}-u_{n,k}}{N},\quad b = \frac{v_{n-1,k}-v_{n+1,k}}{N},\quad N = 0{,}001$$

The analog forms compatible with the model discussed are written as

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$$V_{n,k+1} - V_{n,k} = \frac{1}{2+R/R_0}\,\frac{1}{a}\sum_{i=1}^{a}\frac{1}{V_i}\left[(V_{n-1,k} - 2V_{n,k} + V_{n+1,k})\right] -$$

$$- A\,\frac{1}{b}\sum_{i=1}^{b} V_i'\,(V_{n-1,k} - V_{n+1,k}),$$

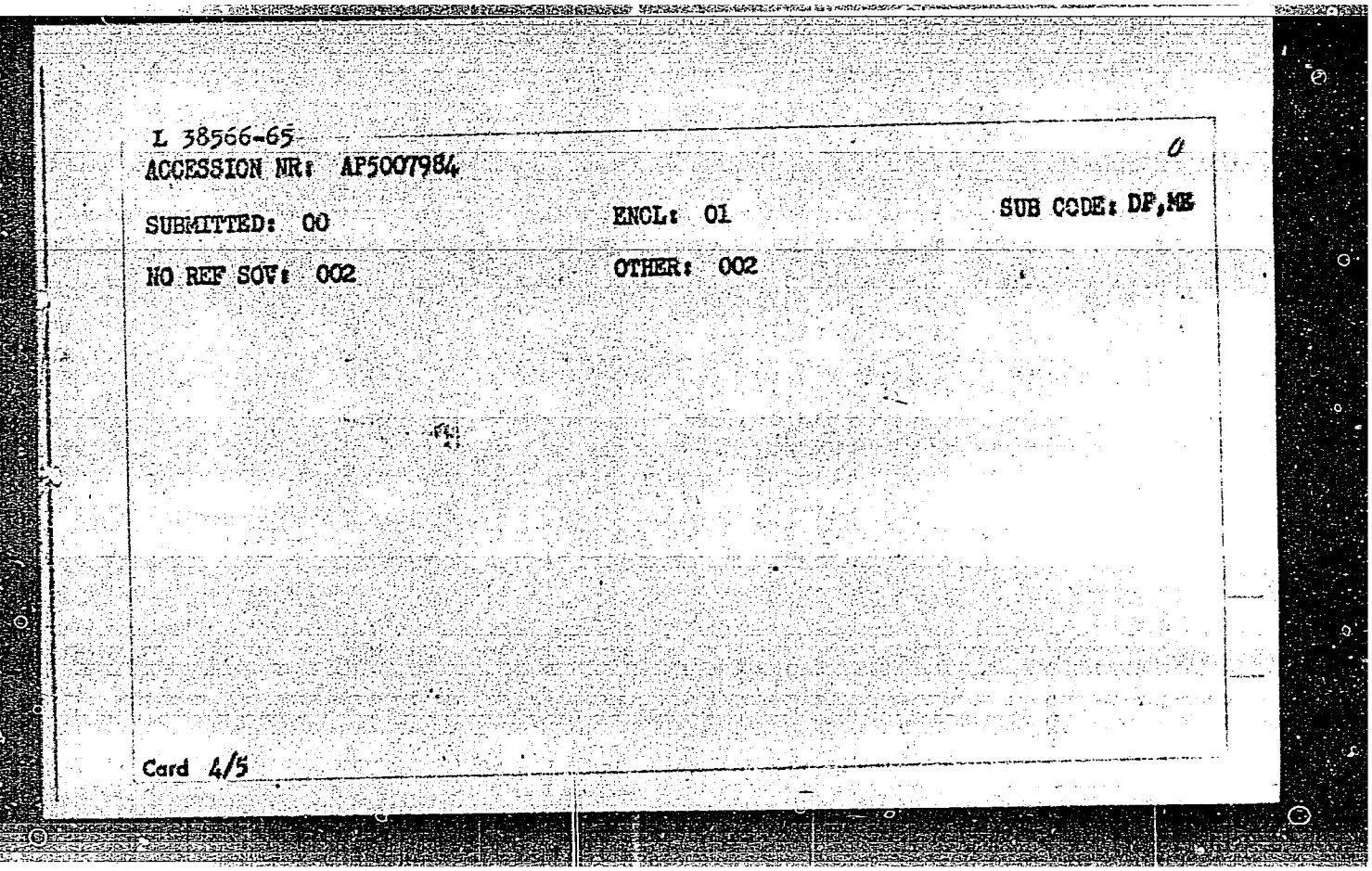
$$\frac{\nu\Delta x}{(\Delta y)^2} = \frac{1}{2+R/R_0},\quad \frac{1}{a}\sum_{i=1}^{a}\frac{1}{a_i} = \frac{1}{a}\sum_{i=1}^{a}\frac{1}{V_i},$$

$$\frac{1}{b}\sum_{i=1}^{b}\frac{v_i}{u_i} = \frac{1}{b}\sum_{i=1}^{b} V_i',\quad \frac{1}{2\Delta y} = A.$$

A brief treatment of analog proportionality constants is given, and the solution of the velocity profile by finite difference is demonstrated graphically. A second example problem, that of outflow from an annular channel with a coaxial cylindrical rod, is solved in a similar manner, and the third example is a solution of the boundary layer in the presence of a chemical reaction on the surface of a catalytically active plate. The model is described as being useful in applied and academic research. System accuracy can be made high by proper grid space selection. Orig. art. has: 10 equations and 5 figures.

ASSOCIATION: none

Card 3/5



L 38566-65

ACCESSION NR: AP5007984 0

SUBMITTED: 00 ENCL: 01 SUB CODE: DP,ME

NO REF SOV: 002 OTHER: 002

Card 4/5

L 38566-65

ACCESSION NR: AP5007984

ENCLOSURE: 01

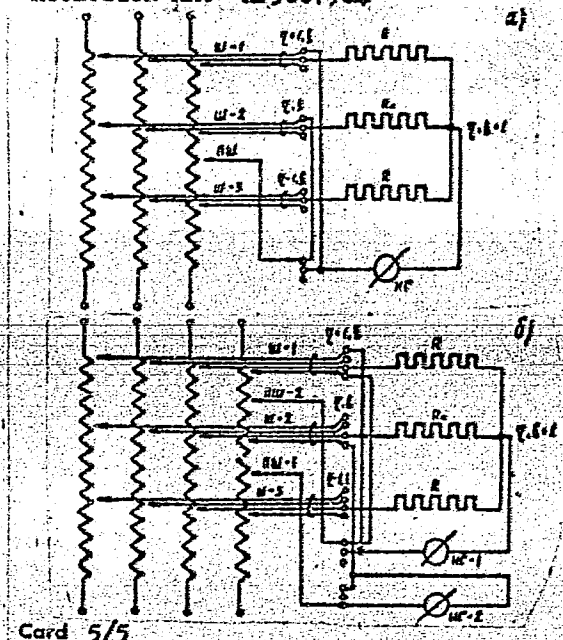


Fig. 1. Electrical diagram of the static electro-integrator.

$П_1 - П_4$ - discrete potentiometers,

ПШ - probe plug,

Ш - plug,

НГ - zero galvanometer,

R, Ro, R - resistances of computational solution element.

a) diagram of individual integrator units for solution of equations (2) and (6);

b) diagram of connections in the integrator for solving equation 8.

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L 63916-65 EWT(1)/EPA(s)-2/EPF(n)-2/EWG(v)/EWA(1) WW

ACCESSION NR: AR5018970 UR/0044/65/000/007/B105/B105
518:517.944/.947

31
B

SOURCE: Ref. zh. Matematika, Abs. 7B514

AUTHOR: Zherebyat'yev, I. F.; Luk'yanov, A. T.

TITLE: Problems of non-stationary heat conductivity with moving boundaries

CITED SOURCE: Sb. tr. soiskateley i aspirantov. M-vo vyssh. i sredn. spets. obrazovaniya KazSSR, 1963(1964), v. 1, no. 2, 171-183

TOPIC TAGS: heat conductivity, differential equation, finite difference, approximation method, mathematic analysis

TRANSLATION: The problem of determining the temperature field and the position of phase division boundaries depending on time in an unbounded plate with given constant or variable heat flow is studied. Conditions for modeling on static electro-integrators are described, and they are used to derive an explicit finite differences approximation of the differential equation. The solution is derived in a discrete form by successive substitutions of the same calculating element at the nodes

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ACCESSION NR: AR5018970

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of the region. Solutions are found both under the assumption that the thermo-physical coefficients are constant in each phase and taking their dependence on the temperature into account. The hardening rates of a semi-limited body at the melting point at the beginning of the process are adduced. The results are analyzed. The effect of the form of dependence of the coefficients on the temperature is studied. Bibliography: 13 titles. Seven illustrations. I. Shelikhova

SUB CODE: TD, MA ENCL: 00

Card 2/2

DOLIDZE, G.M.; KIRTADZE, M.G.; KOLBANOVSKIY, Yu.A.; LUK'YANOV, A.T.; POLAK, L.S.; PUSTYL'NIKOV, L.M.; TSETSKHLADZE, T.V.

Kinetics of radiation-induced isotope exchange of deuterium with hydroxyl groups of silica gel. Kin. i kat. 6 no. 6: 1003-1009 N-D '65 (MIRA 19:1)

1. Institut fiziki AN Gruzinskoy SSR; Institut neftekhimicheskogo sinteza AN SSSR imeni Topchiyeva i Kazakhskiy gosudarstvennyy universitet imeni Kirova. Submitted April 24, 1965.

L 53910-65 EWT(1)/EWP(m)/EPR/FCS(k)/EWA(1) Pd-1/Pi-4 WW

ACCESSION NR: AP5012081 UR/0147/65/000/002/0018/0025

AUTHOR: Ibragimov, I. I., Kashkarov, V. P., Luk'yanov, A. T. 34 B

TITLE: The boundary layer on a moving continuous flat surface.

SOURCE: IVUZ. Aviatsionnaya tekhnika, no. 2, 1965, 18-25

TOPIC TAGS: static analog integrator, electric integrator, boundary problem, differential equation, gas dynamics, liquid solid boundary, Dorodnitsyn variable, flat boundary layer, finite difference approximation, mathematical model

ABSTRACT: The authors give a brief review of some studies into the origin and development of the boundary layer in an incompressible liquid on a continuous flat surface moving at constant velocity. It is pointed out that when Dorodnitsyn variables are used, the problem breaks down into two independent parts and is reduced to an integration of motion and energy equations which are mutually independent. If the viscosity factor is a nonlinear function of temperature, this division becomes unfeasible and the integration of the basic equation system for the boundary layer is enormously complicated, with the result that it is impossible to obtain an analytic solution in this case. At the same time, the use of numerical methods, while permitting a solution of required accuracy, involves a large volume of complex computations and specific difficulties arising as a result of

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the nonlinearity of the equations. In this case, the authors see the use of various computer devices, particularly mathematical models (integrators), as an extremely efficient method. In the present article, a solution is outlined for the equations of a flat boundary layer of compressible gas when the viscosity factor depends nonlinearly on the temperature. The solution described in the paper was obtained by means of static electro-integrators developed at the Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova (Kazakh State University). Dorodnitsyn variables are used in the initial equation system for the boundary layer arising on a continuous plane surface moving at a constant velocity. The action of the static electro-integrator is based on the mathematical simulation of a finite-difference approximation of the initial differential equations. Diagrams of these integration devices are given and explained in the text. The integrator consists of several (depending on the number of equation factors) discrete, functional, high-resolution potentiometers, the leads from which are carried to a common switching panel with multi-contact jacks. Three resistances constitute the computation-solving element. The operational principle of the integrator is explained in the article. The results of the work are presented in the form of velocity and enthalpy profile diagrams. It should be noted in conclusion that, in the present article, the authors did not attempt to derive a solution having maximum accuracy, but strove merely to demonstrate the possibility in principle of employing the mathematical simulation method for a direct solution of the

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L 53910-65
ACCESSION NR: AP5012081

fundamental equation system for the boundary layer using partial derivatives. Orig. art. has: 7 figures and 15 formulas.

ASSOCIATION: None

SUBMITTED: 15Jun64 ENCL: 00 SUB CODE: ME, DP

NO REF SOV: 002 OTHER: 003

Cord 3/3

LUK'YANOV, A.T.; SHARAYA, S.N.

Solving boundary layer problems by the use of static models. Vest. AN Kazakh.SSR 21 no.2:63-69 F '65. (MIRA 18:3)