"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

KUZIN, A.M.; BAKH, N.A., doktor khim.nauk

Congress on radiation research. Vest. AN SSSR 33 no.3:113-116 Mr '63. (MIRA 16:3)

1. Chlen-korrespondent AN SSSR (for Kuzin).
(Radiation—Congresses)

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BUGAYENKO, L.T.; ROMANTSEV, M.F.; BAKH, N.A.

Oxidation-reduction conversions of acceptors in organic solvents under the effect of ionizing radiations. Part 3: Reduction of permanganate ions in acetone solutions. Kin. i kat. 4 no.6:811-814 N-D '63. (MIRA 17:1)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, khimicheskiy fakul'tet.

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S/020/63/149/002/024/028
B117/B186

AUTHORS: Vannikov, A. V., Bakh, N. A.

TITLE: Effect of iodine on the electric properties of products obtained by radiothermal modification of polyethylene

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 149, no. 2, 1963, 357-359

TEXT. The authors studied the effect of iodine on conductivity σ, activation energy ΔE, and thermo-emf α of products obtained by radiothermal modification (RTM) of polyethylene at a radiation dose of $1.5 \cdot 10^{24}$ ev/g and different heat treatment temperatures (HTT). When iodinating samples of high-pressure polyethylene by adsorption of iodine vapors at $+20^{\circ}C$, it was always observed that σ increased by 4 - 6 orders of magnitude, ΔE decreased and α comparatively slight change occurred in α. The new properties are stable at room temperature and reproducible for each specimen. These results show that the iodine adsorbed at $+20^{\circ}C$, as well as oxygen (N. A. Bakh, V. D. Bityukov, A. V. Vannikov, A. D. Grishina, DAN, 144, 135 (1962) interfere with the correlation

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between the properties studied, which is characteristic of the products of RTM of polyethylene. Introduction of iodine at increased temperature (240°C) changes the properties studied of products which corresponded to different HTT in the following way: σ considerably increased, as well as ΔE. α abruptly increased with temperature, the sign changing from positive (p-type conduction) to negative (n-type conduction). The course of the temperature dependence curve of σ and α resembles that of corresponding curves for inorganic semiconductors on transition from extrinsic semiconductor to intrinsic semiconductor. A comparison between the properties of the samples iodinated at 240°C and those of the original samples corresponding to different HTT showed the following: the effect of iodine manifests itself i an increase of conductivity and is particularly pronounced in substances corresponding to a HTT of <500°C. It decreases steadily with increasing HTT. This indicates that iodine facilitates the passing of current carriers through weakly cross-linked intermediate layers. On the other hand, the increase in activation energy indicates also changes in domaines of steric polyconjugation. Although the results obtained are not sufficient to clarify the mode of iodine action on the substances studied, they point

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S/020/63/149/002/024/028
B117/B186

Effect of iodine on the electric ...

the way to producing organic substances with given conduction type. There are 2 figures and 2 tables.

ASSOCIATION: Institut elektrokhimii Akademii nauk SSSR (Institute of Electrochemistry of the Academy of Sciences USSR)

PRESENTED: October 18, 1962, by A. N. Frumkin, Academician

SUBMITTED: October 18, 1962

Card 3/3

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BUGAYENKO, L.T.; KHUAN GUAN'-LIN' [Huang Kuan-lin]; BAKH, N.A.

Radiolysis of sulfuric acid. Dokl. AN SSSR 149 no.5:1099-1102 Ap '63. (MIRA 16:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom A.M.Frumkinym.
(Sulfuric acid) (Radiation)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

L 16974-63 EPF(c)/EWT(m)/BDS AFFTC/ASD Pr-4 AR
[illegible] 7

AUTHOR: Bakh, N. A., Roder, M., and Bugayenko, L. T.

TITLE: Mechanism of radiation-induced oxidation and reduction of inorganic acceptors in acetone solutions

PERIODICAL: Akademiya nauk SSSR. Doklady. v. 149, no. 6, 1963, 1356-1359

TEXT: The authors investigated the effect of X rays on solutions of ions of variable valence Fe^{III}, Fe^{II}, Cu^{II}, Cu^{I}, Cr^{VI}, Cr^{VI}, Mn^{VII}, I^-, and I_3^- in order to clarify the behavior of acetone with respect to oxidizing and reducing acceptors, on using the corresponding chlorides as cations and CrO_3, $KMnO_4$, and KI as anions. It was established that variable-valence ions form with polar solvents solvates with partial electron transfer that is completed upon an excitation. In the cases examined acetone is an electron donor and the energy transmitted by the excited molecules of the solvent to the solvates makes the reduction possible. Thus the high yield of the process is associated with the transfer of excitation energy from acetone to the acceptor. This mechanism is similar to that suggested by Kryukov and Dayn (Doklady.Akademiya nauk SSSR, 138, 153 (1961). There are 4 figures and 1 table.

ASSOCIATION: Institut elektrohkimii Akademii nauk SSSR. Moskovski gosudarstvennyy institut im. M. V. Lomonosova (Institute of Electrochemistry, Academy of Sciences USSR. Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 2, 1963

Card 1/1

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKH, N. A.; VOYEVODSKIY, V. V.; GOLDANSKIY, V. I.; SHTAN, A. S.

"Use of powerful radiation sources in chemical investigations."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

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Card 1/2

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acid ester and salt, respectively), and in the kinetics of accumulation

at 77°K influences the yield of radicals in potassium palitate and tri

at higher temperatures. An early stage of

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

RODER, M.; GO KUN' [Kuo K'un]; BAKH, N.A.; BUGAYENKO, L.T.

Ionized radiation-induced redox conversions of acceptors in organic solvents. Part 5: Transformations of KI and I_2 in acetone solutions. Kin.i kat. 5 no.6:976-980 N-D '64. (MIRA 18:3)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 1, 1964, 121-124

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

REVINA, A. A.; BAKH, N. A.

Free radical reactions in the interaction of oxygen with irradiated potassium palmitate. Dokl. AN SSSR 155 no. 2:410 413 Mr '64. (MIRA 17:5)

1. Institut elektrokhimii AN SSSR. Predstavleno akademikom A. N. Frumkinym.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

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determine the semiconducting properties. A fairly sharp long-wave absorption limit was observed which shifted toward the infrared region as the temperature of the heat treatment spectra were also studied; in all cases,

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ACCESSION NR: AP5011295

was raised. The films were found to be impurity semiconductors, and to have a consider-
photoelectric sensitivity. Results of the study of photoconductivity and its correlation
Vannikov, G. N.

ASSOCIATION: Institut elektrokhimii
Academy of Sciences, SSSR)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

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[illegible] The [illegible] increases as a result of [illegible] reversible. The creation of one new PMC results [illegible] and the concentration of PMC decreased for specimens [illegible] line width and the concentration of PMC decreased for specimens [illegible] period of 40 months. The concentra- [illegible] and the

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

A. V. Vanikov and N. A. Bakh (DAN, 149, 357, 1963) and by A. V. Vanikov (DAN, 152, [illegible] 1963) the photoconductivity of polyethylene samples prepared by the method

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the observed photocurrent depended on the wavelength of the incident light ($\sim 2.3 - 90 \cdot 10^{-14}$ for a wavelength $\lambda = 600$ mμ and an incident energy of ~ 6 m watt/cm^2).

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

PODSOBLYAYEV, A.P.; BAKH, N.A.

Radiolysis and radiation oxidation of piperidine. Zhur. fiz. khim. 38 no.5:1318-1320 My '64. (MIRA 18:12)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova. Submitted June 19, 1963.

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

GRISHINA, A.D.; BAKH, N.A.

Electron paramagnetic resonance study of the reaction of oxygen with the products of a radiation-thermal modification of polyethylene. Part 1: Thermal processing at a temperature up to 750°C. Zhur. strukt. khim. 6 no.2:198-203 Mr-Ap '65. (MIRA 18:7)

1. Institut elektrokhimii AN SSSR.

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

GRISHINA, A.D.; BAKH, N.A., Prinimala uchastiye MITINA, N.I.

Electron paramagnetic resonance study of the reaction of oxygen with the products of radiation-thermal modification of polyethylene. Part 2: Thermal processing at temperatures from 800 to 1100°. Zhur. strukt. khim. 6 no.2: 204-208 Mr-Ap '65. (MIRA 18:7)

1. Institut elektrokhimii AN SSSR.

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

VARNIKOV, A.V.; [illegible], G.N.; [illegible], I.I.; [illegible], N. .

Photoconductivity of organic semiconductors based on polyethylene. Dokl. AN SSSR 160 no.3:635-637 Ja '65.

(MIRA 18:3)

1. Institut elektrokhimii AN SSSR i Institut poluprovodnikov AN SSSR. Submitted July 18, 1964.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

L 8872-66 EPF(n)-2/EWT(1)/EWT(m)/EWP(j)/EWA(h)/EWA(1) IJP(c) GG/RM/WW

ACC NR: AP5025958 SOURCE CODE: UR/0190/65/007/010/1698/1700

AUTHOR: Grishina, A. D.; Bakh, N. A.

ORG: Electrochemical Institute, AN SSSR (Institut elektrokhimii AN SSSR)

TITLE: EPR study of the structural changes in polyethylene caused by irradiation up to high doses

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 10, 1965, 1698-1700

TOPIC TAGS: polyethylene plastic, EPR spectrum, polymer structure, gamma irradiation, conjugated polymer

ABSTRACT: EPR spectra of products obtained by irradiating polyethylene with doses in the 6×10^2 to 2.2×10^4 Mrad range were studied to determine structural changes in the polyethylene. If the dose is below 2×10^3 Mrad the paramagnetic properties are due to linear polyenic structures, while with doses over 6×10^3 Mrad, cyclic polyenic structures are also present. Polyconjugated cyclic structures formed by radiation with 2.2×10^4 Mrad doses were disseminated in the less structurized materials in the radiated products. Orig. art. has: 1 figure.

Card 1/2 UDC: 678.01:53+678.742

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

L 8872-66

ACC NR: AP5025958

SUB CODE: MT, SS, GP/ SUBM DATE: 09Nov64/ ORIG REF: 004/ OTH REF: 003

Card 2/2

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APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

L 29245-66 EWP(j)/EWT(m)/T IJP(c) GG/RM

ACC NR: AP6019308 SOURCE CODE: UR/0074/65/034/010/1733/1752

AUTHOR: Bakh, N. A.; Vannikov, A. V.; Grishina, A. D.; Nizhniy, S. V.

ORG: Institute of Electrochemistry, AN SSSR (Institut elektrokhimii AN SSSR)

TITLE: Polyethylene-based organic semiconductors

SOURCE: Uspekhi khimii, v. 34, no. 10, 1965, 1733-1752

TOPIC TAGS: organic semiconductor, polyethylene plastic, linear accelerator, paramagnetism, photoconductivity

ABSTRACT: The electrophysical and paramagnetic properties of the products of the radiation-thermal modified polyethylene were studied in relation to the absorbed dose and to the conditions of thermal treatment. Conductivity in a constant and variable field, its temperature relationship, differential thermal-e.m.f., structure of the products by EPR and IR-spectroscopic methods, as well as the effect of the contaminating additives and photoconductivity were investigated in a wide range.

The products of the radiation-thermal modified polyethylene were studied as powders and as films. The films were applied to glass or quartz substrates with preliminarily applied gold electrodes. Irradiation of the specimens was conducted in vacuum ampoules ($\sim 10^{-5}$ mm Hg) with fast electrons (5 mev) from the U-12 linear accelerator. Thermal treatment of the irradiated specimens was

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L 29245-66

ACC NR: AP6019308

conducted by the standard method according to which the irradiated specimen was subjected to short-term oxidation at 260°C and subsequent pyrolysis in a vacuum. Study of the electrical characteristics of the specimens in a constant field was conducted in a vacuum ($\sim 10^{-5}$ mm Hg). The film specimens were studied as surface or laminated elements which were placed in a special container. Electrophysical properties of powder products were measured in the element with disc plate electrodes at +20- +150° in vacuum and air and at +20--50° in the case of iodine adsorption on the specimens.

Measurements in a constant field were made with the Ye6-3 teraohmmeter or MO-47 bridge in the case of low ohmic specimens. Conductivity in the variable field was measured with the Ye10-2 full conductance bridge.

Most of the results presented in this article were obtained on films of radiation-thermal modified polyethylene. Electrophysical properties were studied on polyethylene specimens irradiated up to the absorption of three different doses: 1.2×10^3, 6.9×10^3, and 2.4×10^4 megarads. Measurements of specimen conducitivity in the range -25- + 150°C indicated excellent satisfaction with the exponential relationship:

$$\sigma = \sigma_0 \exp(-\Delta E/kT)$$

Card 2/3

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

L 29243-66

ACC NR: AP6019308

Measurements of the differential thermal-e.m.f. indicated that the prepared materials are p-type semiconductors. In the -50- + 150°C region the differential thermal-e.m.f. does not depend on the average temperature of the specimens in the limits of experimental error. The values of σ_{20}, ΔE, and α in relation to the dose absorbed by polyethylene and the thermal treatment temperature for powder and film specimens are presented. Orig. art. has: 14 figures, 15 formulas and 5 tables. [JPRS]

SUB CODE: 20, 11 / SUBM DATE: none / ORIG REF: 020 / OTH REF: 010

Card 3/3

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKH-KAPLUNOVSKAYA, K.G.

Bakh-kaplunovskaya, K.G. "An experiment on acclimatization of plants in the botanic park of Askaniya-Nov," Byulleten' Glav. Botan. sada, Issue 1, 1948, p. 50-54

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHAA BAKRI, aspirant, arkhitektor

Industrial construction in the United Arab Republic. Izv. ASiA 4 no.2:37-44 '62. (MIRA 15:9)

1. Institut promyshlennykh zdaniy Akademii stroitel'stva i arkhitektury SSSR.
(United Arab Republic--Construction industry)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADUR, K.

Effect of modification in the carbon-nitrogen ratio on metabolism in cultures of Dhar yeasts. Mikrobiologiia 24 no.2:141-146 Mr-Ap '55.
(MLRA 8:7)

1. Khimicheskiy fakul'tet Allakhabadskogo universiteta Indiya.
(YEASTS, culture,
medium, eff. of carbon-nitrogen ratio on resp.)
(CARBON,
eff. of carbon-nitrogen ratio variations on yeast resp.)
(NITROGEN,
eff. of carbon-nitrogen ratio variations on yeast resp.)
(CULTURE MEDIA,
for yeasts, eff. of carbon-nitrogen ratio variations)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, A., kand.med.nauk; KOKANBAYEVA, R.Kh., kand.med.nauk

Therapeutic action of quateleron in stenocardia. Terap.arkh. no.7:56-58 Jl '62. (MIRA 15:8)

1. Iz kafedry gospital'noy terapii (zav. - chlen-korrespondent AMN SSSR prof. Z.I. Umidova) Tashkentskogo meditsinskogo instituta.

(ANGINA PECTORIS) (PARASYMPATHOLYTICS)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADIROV, A. B.

"Functions of the Superficial Breathing Apparatus of Healthy People and of Patients With Hypertensive Disease Under the Climatic Conditions of Tashkent." Cand Med Sci, Tashkent State Medical Inst imeni V. M. Molotov, Tashkent, 1954. (KL, No 17, Apr 55)

SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions. (16)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, A.B., kand.med.nauk

Functional state of the external respiration apparatus in healthy people and in hypertension patients in a hot climate. Terap.arkh. 29 no.11:42-47 N '57. (MIRA 11:2)

1. Iz gospital'noy terapevticheskoy kliniki (dir. - chlen-korrespondent AMN SSSR prof. Z.I.Umidova) lechebnogo fakul'teta Tashkentskogo meditsinskogo instituta.

(RESPIRATORY TRACT, physiology,
eff. of hot climate in normal subjects & in hypertension (Rus))
(HYPERTENSION, physiology,
resp. appar. in hot climate (Rus))
(CLIMATE, effects,
hot, on resp. tract in normal cond. & in hypertension (Rus))

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, K.B.

Excretion of the enzymes enterokinase and alkaline phosphatase with the feces in chronic enteritis and enterocolitis. Med. zhur. Uzb. no.2:59-62 F '62. (MIRA 15:4)

1. Iz kliniki lechebnogo pitaniya Instituta pitaniya AMN SSSR (zav. otdelom lechebnogo pitaniya - doktor meditsinskikh nauk L.M.Levitskiy).
(ENTEROKINASE) (PHOSPHATASES) (INTESTINES—DISEASES)
(FECES—ANALYSIS)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, K.B.

Enzyme excretion function of the small intestine in chronic enteritis and enterocolitis. Vop. pit. 21 no.1:29-33 Ja-F '62. (MIRA 15:2)

1. Iz kliniki lechebnogo pitaniya (zav. - doktor meditsinskikh nauk L.M.Levitskiy) Instituta pitaniya AMN SSSR, Moskva.
(INTESTINES--DISEASES) (COLITIS) (ENZYMES)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, K. B.

Significance of some intestinal enzymes in the duodenal contents and feces for evaluating intestinal activity in chronic enteritis and enterocolitis. Terap. arkh. 34 no.4:78-82 '62. (MIRA 15:6)

1. Iz kliniki lechebnogo pitaniya (zav. - doktor meditsinskikh nauk L. M. Levitskiy) Instituta pitaniya AMN SSSR (dir. - chlen-korrespondent AMN SSSR prof. A. A. Pokrovskiy)

(DIGESTIVE ENZYMES) (INTESTINES—DISEASES)
(FECES—ANALYSIS)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, K.B.

Effect of a high protein on the formation and excretion of some enzymes by the small intestine in chronic enteritis and enterocolitis. Vop.pit 21 no.4:35-41 Jl-Ag '62. (MIRA 15:12)

1. Iz kliniki lechebnogo pitaniya (zav. - doktor med.nauk L.M.Levitskiy) Instituta pitaniya AMN SSSR, Moskva.
(INTESTINES--DISEASES) (PROTEINS) (DIGESTIVE ENZYMES)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

TARNOPOL'SKAYA, P.D., doktor med. nauk; BAKHADYROV, K.B., aspirant

Comparison of the intensity of excretion of some intestinal enzymes with the motor activity of the intestines in chronic enteritis and enterocolitis. Med. zhur. Uz b. no.9:15-19 S '62. (MIRA 17:2)

1. Iz kliniki lechebnogo pitaniya (zav. - doktor med. nauk L.M. Levitskiy) Instituta pitaniya AMN SSSR (dir. - chlen-korrespondent AMN SSSR prof. A.A. Pokrovskiy).

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHADYROV, K.B.; SHAMSUTDINOVA, R.K.

Condition of some enzymes in patients with chronic enteritis and enterocolitis under various climatic conditions. Med. zhur. Uzb. no.9:57-60 S '62. (MIRA 17:2)

1. Iz kafedry propedevtiki vnutrennikh bolezney (zav. - prof. E.I. Atakhanov) pediatricheskogo i sanitarnogo fakul'tetov Tashkentskogo gosudarstvennogo meditsinskogo instituta.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BEYUL, Ye.A., kand. med. nauk; BAKHADYROV, K.B.; MYAGKOVA, L.P.

Study of food digestion and absorption processes in patients with functional disorders of the small intestine. Med. zhurn. Uzb. no.5:45-49 My'63 (MIRA 17:4)

1. Iz kliniki lechebnogo pitaniya (dir. - doktor med. nauk P.S. Savoshchenko) Instituta pitaniya AMN SSSR.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHALBASHYAN, Dzh.A.

Grain quality of branched rivet wheat as affected by the number of kernels in the ear. Izv.An Arm.SSR.Biol.i sel'khoz.nauki. 5 no.8: 25-33 '52. (MLRA 9:8)

1. Institut genetiki i selektsii rasteniy Akademii nauk Armyanskoy SSR.

(Armenia--Wheat)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

SURMENYAN, G.A.; BAKHALBASHYAN, Dzh.A.

Comparative study of branched rivet wheat. Izv.AN Arm.SSR.Biol.i sel'khoz.nauki 6 no.1:17-25 '53. (MLRA 9:8)

1. Institut genetiki i selektsii rasteniy AN Arm.SSR.
(Armenia--Wheat--Varieties)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHALBASHYAN, Dzh.A.

Effect of the tillering rate of wheat on the quality of grain. Izv. AN Arm. SSR. Biol. i sel'khoz. nauki. 6 no.3:79-82 '53. (MLRA 9:8)

1. Institut genetiki i selektsii rasteniy Akademii nauk Arm. SSR.
(WHEAT)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

SURMENYAN, G.A.; BAKHALBASHYAN, Kh.A.

Improving the quality of wheat grain by surgical means. Izv.AN Arm.SSR.Biol.i sel'khoz.nauki 7 no.2:49-60 '54. (MLRA 9:8)

1. Institut genetiki i selektsii rasteniy Akademii nauk Armyanskoy SSR.

(Wheat)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHALBASHYAN, Dzh. A.

Setting of seeds in wheat when crossing ears from different tillering levels of the plant. Izv.AN Arm.SSR.Biol.i sel'khoz.nauki 8 no.2:39-47 F '55. (MLRA 9:8)

1. Institut genetiki i selektsii rasteniy AN Arm. SSR.
(Wheat)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

SARKISYAN, S.A.; BAKHALBASHYAN, Dzh.A.

Effectiveness of annual green manure grasses in increasing wheat yields under conditions prevailing in the semidesert zone of the Ararat Lowland. Izv.AN Arm.SSR.Biol.i sel'khoz.nauki 9 no.10:71-80 '56. (MLRA 9:12)

1. Akademiya nauk Armyanskoy SSR.
(Ararat region--Green manuring) (Wheat)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

GALSTYAN, A.Sh.; SARKISYAN, S.A.; BAKHALBASHYAN, Dzh.A.

Changes in the biological activity of reclaimed semidesert rocky soils. Izv. AN Arm. SSR. Biol. nauki 15 no.6:29-37 Je '62. (MIRA 15:6)

1. Institut zemledeliya i Institute pochvovedeniya i agrokhimii Ministerstva sel'skogo khozyaystva Armyanskoy SSR.

(ARMENIA--SOIL BIOLOGY)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHALBASH'YAN, V.I., general-mayor aviatsii.

Fulfilling the decisions of the October Plenum. Vest. Vozd. Fl. 41 no.10:10-16 O '58. (MIRA 11:10)
(Russia--Air force) (Communist Party of the Soviet Union--Party work)

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHALOV, GRIGROIY TIKHONOVICH

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1954

Spravochnik Gal'vanostega (handbook on Electroplating, by) G. T. Bakhvalov, L. N. Birkgan, V. P. Labutin. Izd. 2, Perer. i Dop. Moskva, Metallurgizdat, 1954.
650 p. Illus. Diagrs., Tables.
"Literatura": p. 649-650.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

ACC NR: AP7000642 SOURCE CODE: UR/0414/66/000/003/0059/0066

AUTHOR: Lukashenya, G. V. (Moscow); Malinenko, G. M. (Moscow); Bakhman, N. N. (Moscow); Belyayev, A. F. (Moscow)

ORG: none

TITLE: Temperature coefficient of burning velocity in condensed mixtures at various component ratios

SOURCE: Fizika goreniya i vzryva, no. 3, 1966, 59-66

TOPIC TAGS: ammonium perchlorate, rocket propellant, solid propellant, composite propellant, propellant, solid propellant combustion, temperature coefficient, burning velocity, perchlorate, ammonium compound, combustion temperature

ABSTRACT: A study has been made of the initial temperature (T_0) dependence of the burning velocity (u) for model mixtures of ammonium perchlorate (AP) with polystyrene (PS), poly(methyl methacrylate) (PMM), polyoxymethylene, or bitumen. Powder samples were mixed and compacted in brass shells to a density close to the maximum. Jellied mixtures were also prepared for AP+PS and AP+PMM mixtures. The experiments were conducted in a constant-pressure bomb under nitrogen as shown in Fig. 1. The charge was placed in the pocket of the hot-air heater. A thermocouple was glued to the bottom end of the charge. The charge was ignited by means of an incandescent wire from the bottom so that

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combustion proceeded upward. Combustion time was measured with a piezoelectric pickup. To record accurately combustion completion, a small amount of fast-burning potassium picrate was placed at the upper end of

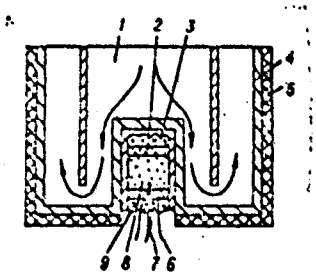

Fig. 1. Charge heating

1 - Hot-air stream; 2 - potassium picrate; 3 - thermal insulation; 4 - body of heater (stainless steel); 5 - thermal insulation (asbestos); 6 - spiral for ignition; 7 - thermocouple; 8 - charge; 9 - igniting composition.

the charge. The data given in tabular and graphic form involve T_0 values from -65 to 200C, combustion temperatures from 1500 to 2900K, and pressures from 1 to 100 atm. It was found that in all cases u is monotonic increasing with T_0. The dependence $u(T_0)$ was conveniently characterized by the temperature coefficient $\beta = d\ln u/dT_0$. β was highly dependent on the fuel/oxidizer ratio (α). The curve $\beta(\alpha)$ had a minimum whose position corresponded to that of the burning velocity peak. For mixture compositions not too far from stoichiometric, β increased with

Card 2/3

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oxidizer particle size. The experimental results were in good agreement with the idea that β is determined by the temperature (T_b) in the combustion zone region which determines the burning velocity; if T_b is large, β is small and vice versa. Orig. art. has: 5 figures and 7 tables. [W. A. 68] [SM]

SUB CODE: 21/ SUBM DATE: 08Apr66/ ORIG REF: 005/ OTH REF: 004

Card 3/3

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

Banyalov, N. S. On estimation [illegible] [illegible] integration [illegible] differential [illegible]

[illegible]

[illegible] conditions [illegible]

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHVALOV, N. S.

3001

Bahvalov, N. S. Some remarks concerning numerical integration of differential equations by the method of finite differences. Dokl. Akad. Nauk SSSR (N.S.) 104 (1955), 805–808. (Russian)

The process of integration of the differential equation $y' = f(x, y)$ with the initial condition $y(x_0) = y_0$ is considered [see Bahvalov, same Dokl. (N.S.) 104 (1955), 683–686; MR 17, 412]. It is shown that the solution of the difference equation used in the process is unstable with respect to the round-off error. An estimation of the error of the solution of the differential equation for a particular case is given. S. Kulik (Columbia, S.C.)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHVALOV, N. S., Cand Phys-Math Sci -- (diss) "On the dompo-
sition of equations of terminal differen~~tialities~~ in the
approximate solution of Laplace's Equation." [Mos], 1957.
5 pp (Min of Higher Education USSR, Mos Order of Lenin and
Order of Labor Red Banner State Univ im M. V. Lomonosov,
Mech-Math Faculty), 100 copies ~~(KL, 52-57, 103)~~ (KL, 52-57, 103)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

PA - 3002

AUTHOR BAKHVALOV N.S.

TITLE On the Number of arithmetical Operations in Solving Poisson's equation for a Square by Means of Finite Differences.
(K voprosu o chisle arifmeticheskikh deystviy pro reshenii uravneniya Puassona dlya kvadrata metodom konechnikh raznostey.)-Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 2, pp 252-254 (U.S.S.R.)
Received 6/1957 Reviewed 6/1957

ABSTRACT The employment of mathematical machines(computors) makes it possible to increase the number of operations to be carried out and to obtain the solution more exactly. Consequently the following problem arises: The methods be investigated from the point of view of the increase of the arithmetical or logical operations respectively with $\varepsilon \to 0$ (that is with increasing exactness) and the methods of the lowest possible increase of the operations be found out. The author investigated the system of the linear equations $L_{ij}(v_{ij}) = (v_{i+1,j} + v_{ij+1} + v_{i-1,j} + v_{i,j-1} - 4v_{ij})/h^2 = f_{ij}$

when $0 < i, j < N$ (N - whole, $h = 1/N$);

$v_{ij} = \varphi_{ij}$ in the case of $0 \leqslant i, j \leqslant N$, if $i(N-i)(N-j) = 0$

This system of equations results from solving Poisson's equation $(\partial^2 m/\partial x^2) + (\partial^2 m/\partial y^2) = f(x,y)$ in the square $0 \leqslant x,y \leqslant 1$ by means of the method of finite differences. Here DIRICHLET's boundary condition $u|_r = \varphi(x,y)|_r$ must be taken into consideration. $v_{ij}, \varphi_{ij}, \ldots$ here denote the values of the functions $v(x,y), \varphi(x,y), \ldots$, at the point (ih, jh).

Card 1/2

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On the Number of a Arithmetical Operation in Solving PA - 3002
Poisson's equation for a Square by Means of Finite Differences.

If the difference - analogs of GREENS functions are known for the problems of DIRICHLET and for the problem of POISSON, the putting down of the values required all v_{ij} $(0<i,j<N)$ $\asymp N^2$ additions, $\asymp N^2$ multiplications and the employment of $\asymp$ auxiliary numbers. Let N be equal to 2^s. In this case it is possible to compute the values of all v_{ij} by means of $\asymp N^2 \log N$ additions and $\asymp N^2 \log N$ multiplications, if GREEN's functions of DIRICHLET's gradually shown how to do it; In connection with areas of any shape the solution of POISSON's equation of a system of equations with finite differences can be reduced to the solution of a system corresponding to LAPLACE's equation by means of the here discussed method. (Without illustrations)

ASSOCIATION Moscow State University
PRESENTED BY SOBOLEV S.L., Member of the Academy
SUBMITTED 5.10.1956
AVAILABLE Library of Congress
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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

AUTHOR: Bakhvalov, N.S. 20-114-3-1/60

TITLE: On a Procedure of the Approximated Solution of the Laplace Equation (Ob odnom sposobe priblizhennogo resheniya uravneniya Laplasa)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 114, Nr 3, pp 455-458 (USSR)

ABSTRACT: In a finite part of the xy-plane a domain G is assumed, the boundary Γ of which consists of a finite number of stretchable sections of rectified curves. Within this domain the Laplace equation $\Delta u = 0$ with the Dirichlet boundary condition $u|_\Gamma = \varphi$ has to be solved. The method of the approximated solution shown in the present paper with increasing accuracy of the result demands less memory work and fewer arithmetic operations than the known methods for the solution of the Laplace equation by means of differential equations. As usual, a system of differential equations is put together with respect to the values of the solution in the points (ih, jh). These points are called nodes (i, j). The differences displacing the Laplace operator and the partial derivations are given. The manner of computation is discussed

Card 1/2

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20-114-3-1/60

On a Procedure of the Approximated Solution of the Laplace Equation

step by step; the formulas are here not given on account of the many different denotations. For the evaluation of the convergence velocity of the solution a majorant is constructed. There are 1 figure and 6 references, 5 of which are Slavic and 1 English.

ASSOCIATION: Moscow State University imeni M.V. Lomonosov (Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova)

PRESENTED: December 15, 1957, by S.L. Sobolev, Member of the Academy

SUBMITTED: December 7, 1957

Card 2/2

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

20-114-6-2/54

AUTHOR: Bakhvalov, N. S.

TITLE: On the Setting up of Equations With Finite Differences for an Approximate Solution of Laplace's Equation (O sostavlenii uravneniy v konechnykh raznostyakh pri priblizhennom reshenii uravneniya Laplasa)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 6, pp. 1146-1148 (USSR)

ABSTRACT: The solution of the Laplace equation $\Delta u = \sum_{\alpha=1}^{n} u_{x_\alpha x_\alpha} = 0$ is sought, by assumption of the Dirichlet boundary condition $u|_S = \varphi$, within the domain G which lies in a finite part of the m-dimensional space and is bounded by the surface S. The author here examines for $m = 2$ and $\gamma \leqslant 3$ an approximate method of solution in which the memory to be applied does not exceed $H(\varepsilon)^{1+\beta}$ numbers. The number of arithmetical operations shall stay below

$$\varkappa H(\varepsilon)^{1+(\gamma+\beta)/3}$$

where $\beta > 0$ is optional. For any $K > 0$ a method of solution with the use of a memory smaller than $\varkappa H(\varepsilon)^{1+\beta}$, can be de-

Card 1/2

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

20-114-6-2/54

On the Setting up of Equations With Finite Differences for an Approximate Solution of Laplace's Equation

monstrated. In that connection $\beta > 0$ shall be optional and the number of operations shall be smaller than $\varkappa H(\varepsilon)^{1+K}$. In that connection certain formulae with any degree of accuracy shall be valid. The here proposed method can in certain sense not be further improved. An explicit expression is given for the initially mentioned Laplace equation. There are 7 references, 6 of which are Slavic.

PRESENTED: January 15, 1957, by S. L. Sobolev, Member of the Academy

SUBMITTED: January 7, 1957

Card 2/2

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0"

"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHVALOV, N. S.

"The Number of Operations in the Numerical Solution of the Plane Dirichlet Problem for Laplace's Equation."

paper submitted at International Congress Mathematicaias, Edinburgh, 14 - 21 Aug 58.

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

N.S. Bakhvalov

16(1)

AUTHORS: Skoryy, I.A., University Lecturer, and Kopytov, V.D., Scientific Assistant SOV/55-58-2-33/35

TITLE: Lomonosov - Lectures 1957 at the Mechanical-Mathematical Faculty of Moscow State University (Lomonosovskiye chteniya 1957 goda na mekhaniko-matematicheskom fakul'tete MGU)

PERIODICAL: Vestnik Moskovskogo Universitety. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958 , Nr 4, pp 241-246 (USSR)

ABSTRACT: The Lomonosov lectures 1957 took place from October 17 - October 31, 1957 and were dedicated the 40-th anniversary of the October revolution.

16. A.D. Gorbunov, Lecturer and B.M. Budak, Lecturer : Difference Methods for the Solution of Hyperbolic Equations.
17. N.S. Bakhvalov : Number of Calculation Operations for the Solution of Elliptic Equations.
18. V.I. Lebedev, Aspirant : Difference Method for the Solution of the Sobolev-System.
19. Professor Ye.B. Dynkin : Markov Processes and Semigroups.
20. A.G. Kostyuchenko, Candidate of Physical-Mathematical Sciences : Decomposition of Differential Operators With Respect to Generalized Eigenfunctions.
21. F.A. Berezin, Candidate of Physical-Mathematical Sciences: Foundations of the Theory of Spherical Harmonics on Manifolds.
22. V.M. Borok, Aspirant : General Properties of Partial Evolution Systems.
23. V.A. Usnenskiy, Candidate of Physical-Mathematical Sciences : On Constructive Mathematical Analysis.
24. P.L. Ul'yanov, Lecturer : Reversal of Terms in Trigonometric Series.
25. I.G. Petrovskiy, Academician and Ye.M. Landis, Senior Scientific Assistant : On the Number of Boundary Cycles of a Differential Equation of First Order With a Rational Right Side.

The contents of all the lectures have already been published.

Card 5/5

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

69001

S/055/59/000/04/001/025

~~16(1), 16(2)~~ 16.6500

AUTHOR: Bakhvalov, N.S.

TITLE: On the Approximate Calculation of Multiple Integrals

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, Vol. 14, Nr 4, pp 3-18 (USSR)

ABSTRACT: The author considers the approximate calculation of multiple integrals according to the Monte-Carlo-method and several modifications of it. § 1 contains estimations from below of the possible error for the calculation of the arithmetic mean of a function if the information about the values of the function is used in at most N points (for a certain function of the considered class in this case the absolute value of the error is $\geqslant C_0 N^{-1/2}$) and for the calculation of $J(f) = \int_0^1 \cdots \int_0^1 f(x_1, \ldots, x_m) dx_1, \ldots, dx_m$, where $f \in H(p, A, \lambda)$ (compare [Ref 2]); in this case it is shown that for a consideration of at most N points the deviation of the approximation from the real value for a certain function of the class is $C'_{m,p+\lambda} A N^{-\frac{p+\lambda}{m}}$, while the mean value of the

Card 1/3

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On the Approximate Caloulation of Multiple Integrals S/055/59/000/04/001/026

absolute value of the error is $\geqslant C''_{m,p+\lambda} A N^{-(\frac{p+\lambda}{m}+\frac{1}{2})}$.

§ 2 begins with the consideration that in the case of smooth integrands it is more suitable to choose N points which depend on eachother instead of independent N points. The author proposes a method basing on this consideration if $f \in H(p,A,\lambda)$ and besides in every variable it has the period 1. The order of the errors is $O(N^{-\frac{p+\lambda}{m}})$, the order of the mean value of the amount of errors is $O(N^{-(\frac{p+\lambda}{m}+\frac{1}{2})})$. With respect to the results of § 1 the method is the best possible one. In § 3 the author proves the existence of quadrature formulas being suitable in a certain sense, for the case that the integrand has the period 1 in all variables and the Fourier coefficients decrease with the γ-th ($\gamma > 1$) power of the number ($f \in E_\gamma(A)$). § 4 gives a generalization of the method for smooth functions proposed by I.I.Shapiro-Pyatatskiy [Ref 7]. In § 5 the author investigates

Card 2/3

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On the Approximate Calculation of Multiple Integrals S/055/59/000/04/001/026

the set of the points which in the case $f \in E_{\gamma}(A)$ correspond to the suitable quadrature formulas.
The author mentions N.M.Korobov, and A.Ya.Khinchin; he thanks N.N.Chentsov for some advices.
There are 11 references, 7 of which are Soviet, 2 English, 1 Norwegian, and 1 American.

ASSOCIATION: Kafedra vychislitel'noy matematiki (Chair of Numerical Mathematics)

SUBMITTED: April 6, 1959

Card 3/3

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S/055/59/000/05/016/020

16.6500

AUTHOR: Bakhvalov, N. S.

TITLE: On the Numerical Solution of the Dirichlet Problem for the Laplace Equation

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, No. 5, pp. 171-196

TEXT: For the numerical solution of the Dirichlet problem for the Laplace equation the author investigates the following questions: 1.) The growth of the minimum number of computing operations, which are necessary for a given exactness, under increasing exactness, 2.) a method for which the above order of growth is minimum. In particular the author treats the estimation of the error for a uniform net, the increase of the net meshes under removal from the boundary, the difference analogue of the Green formulas for the square, the setting up of the system of difference equations with the aid of this analogue, the case where the differential properties of the boundary are better than those of the boundary function.

Card 1/2

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S/044/62/000/005/054/072
C111/C444

AUTHOR: Bakhvalov, N. S.

TITLE: An estimation in the mean for the remainder of the quadrature formulas

PERIODICAL: Referativnyy zhurnal, Matematika, no. 5, 1962, 47, abstract 5V229. ("Zh. vychisl. matem. i matem. fiz.", 1961, 1, no. 1, 64-77)

TEXT: Estimated is the mathematical expectation (ME) of the absolute value of the error $R_n(f)$ of the quadrature formula $S_n(f)$ at numerical calculation of the integral

$$J(f) = \int_0^1 \dots \int_0^1 f(x_1,\dots,x_s)\, dx_1,\dots, dx_s .$$

In the one-dimensional case one shows for the function $f(x) \in P_\alpha(C)$, i. e. for such functions $f(x) \sim \sum_{n=-\infty}^{n=\infty} a_n \exp(2\pi i n x)$, for which is

Card 1/4

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$$\sum_{n=-\infty}^{n=\infty} |a_n|^2 \, |n|^{2\alpha} < C^2$$

for the rectangle formula

$$S_n(f) = n^{-1} \sum_{k=1}^{n} f\left(\frac{k}{n}\right)$$

that in case one understands the values n in the interval $N+1 \leq n \leq 2N$ as equally probable, for $\alpha > 1$, $Nq = r$ - fully and for $q < 1$ with the probability 1-q there holds the formula

$$R_n(f) = O(Cq^{-1/2} n^{-\alpha-1/2})$$

while the dispersion of the error is a quantity $O(C^2N^{-2\alpha-1})$. For $\alpha > \frac{1}{2}$ there is

$$R_n(f) = O(Cq^{-1}n^{-\alpha-1/2}) .$$

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For $f \in H(p, A, \lambda)$, $p + \lambda > 1$ there is

$$R_n(f) = O(Aq^{-1/2} n^{-(p+\lambda-\varepsilon)-1/2})$$

and for $p + \lambda \leq \frac{1}{2}$ there is

$$\text{M. E. } |R_n(f)| = O(AN^{-2(\lambda-\varepsilon)}), \quad \varepsilon > 0 .$$

In the more-dimensional case the error of R_n which appears in the calculation of multiple integrals is estimated by using successively the one-dimensional quadrature formula

$$\sup_{f \in H(p,A,\lambda)} \text{M. E. } |R_n(f)| \geq C_{p+\lambda} AN^{-\frac{p+\lambda}{s} - \frac{1}{2s}}$$

for every variable; further for the case of the rectangular formulas of the numerical integration on the class of periodic functions $V_s^q(B)$. At last one considers the non-periodic case: In the calculation of the

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integral of $f \in H(p, A, \lambda)$ according to the formulas of Simpson for n=2 and Gregory (here one considers differences up to the order p) one estimates $ME\,|R_n(f)|$:

$$ME\,|R_n(f)| = O(AN^{-(p+\lambda-\varepsilon)-\frac{1}{2}}), \quad \varepsilon > 0.$$

[Abstracter's note: Complete translation.]

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16.3500 16.6500

AUTHOR: Bakhvalov, N. S. (Moscow)

TITLE: Estimating the error of numerical integration of a quasilinear first-order equation

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 1, no. 5, 1961, 771 - 783

TEXT: The solution of the Cauchy problem for a system of quasilinear equations of the first order, even in smooth initial conditions, may become discontinuous in the course of time. For uniqueness of the solution it is necessary to require that certain relations of the type of conservation laws, and certain inequalities be satisfied at the intervals of discontinuity. Consequently, the stability of the difference equations and of their approximations to the differential equations on smooth solutions is insufficient for convergence in the presence of discontinuities. This constitutes the difference from the linear case, where stabilities and approximations of smooth solutions are, as a rule, sufficient for the convergence of discontinuous solutions. Many equations of mechanics arise from integral conservation laws. A characteristic property of the majority of

Card 1/5

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numerical integration schemes is the fact that they are transformed formally into approximating schemes of the form

$$u_{it} + \bar{f}_i(u_{1x}, \ldots, u_{sx}, t, x) = \int_{x_0(t)}^{x} F_i(u_{1x}, \ldots, u_{sx}, t, x)\, dx, \qquad (3)$$

where

$$F_i(t, x) = \int_{x_0(t)}^{x} f_i(u_1(t, x), \ldots, t, x)\, dx,$$

$$\Phi_i(t, x) = \int_{(t_0, x_0)}^{(t, x)} \psi_i(u_1(t, x), \ldots, t, x)\, dx -$$
$$- (\varphi_i(u_1(t, x), \ldots, t, x) - F_i(t, x))\, dt,$$

The author obtains an estimate for the error in integrating the equation

$$u_t + (f(u))_x = 0 \qquad (4)$$

for a scheme of this kind, which is typical of a scheme considered by Godunov.

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Estimating the error of numerical integration...

It is assumed that the Cauchy problem of equation (4) is solved in the half-plane $t > 0$ with the initial condition $u^0|_{t=0} = u^0(x)$, where $u_2 \leq u^0(x) \leq u_1$. It is further assumed that $\varphi''_{uu} \geq \gamma > 0$ and $0 \leq \varphi'_u$ for $u_2 \leq u \leq u_1$, and the difference equation

$$L(u_{n,m}) = (u_{n+1,m} - u_{n,m})\tau^{-1} + (\varphi(u_{n,m}) - \varphi(u_{n,m+1}))h^{-1} = 0 \qquad (5)$$

is considered, here τ and h are intervals along t and x, $u_{n,m}$ is the approximation to the value of the quantity $u^0(n\tau, mh)$. It is assumed that $u_2 = 0$. Two classes of initial conditions are considered: 1) $u^0(x)$ is an arbitrary measurable function, 2) $u^0(x)$ satisfies the condition $u^0(x_2) - u^0(x_1) \leq K(x_2 - x_1)$ for almost all pairs of numbers x_1 and x_2, so that $-X - x_0 \leq x_1 \leq x_2 \leq x_0$, where x_0 is some constant independent of τ and h, $K \geq 0$. In this latter case the solution does not have rarefaction waves which arise at $t = 0$, $-X - x_0 \leq x \leq x_0$. The author shows that

if $\varphi(x) \in C_1(M)$, т.е. $|\varphi'|(x)| \leq M$, and if $\varphi(x_1) = \varphi(x_2) = 0$, then

$$\int_{x_1}^{x_2} \psi(x)\varphi'(x)\,dx = -\int_{x_1}^{x_2} \psi'(x)\varphi(x)\,dx$$

and

Card 3/5

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30734
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Estimating the error of numerical integration...

Pure and Appl. Math., 1954, 7, 159 - 193; P. D. Lax. Hyperbolic systems of con-
servation Laws II. Communs Pure and Appl. Math., 1957, 10, 537 - 566.

SUBMITTED: March 17, 1960

Card 5/5

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHVALOV, N.S.

Accumulation of calculational error in the numerical solution of differential equations. Vych. met. i prog. 1:47-68 '62. (MIRA 15:8)

(Differential equations)

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

S/794/62/000/001/001/010

AUTHOR: Bakhalov, N. S.

TITLE: On the accumulation of computational error in the numerical solution of differential equations.

SOURCE: Vychislitel'nyye metody i programmirovaniye; sbornik rabot Vychislitel'nogo tsentra Moskovskogo universiteta. no.1. Ed. by N. P. Trifonov, G. S. Roslyakov, and Ye. A. Zhogolev. [Moscow] Izd-vo Mosk. un-ta, 1962, 47-68.

TEXT: Of the three component parts of the error in the result of a numerical solution, namely, (1) the unavoidable error due to the inaccuracy of initial data, (2) the errors inherent in the method of the solution, and (3) the computational error due to the rounding-off of the results in the course of the calculation, the present paper examines solely the problem of the computational error and examines various methods for the solution of a problem from the point of view of a minimization of errors of that type. The presentation is occasionally not strictly rigorous, and the error estimates are strongly overrated, since the objective of the work is to show on examples how the estimate is made and to indicate the advantages of the various methods of solution, but not to determine the numerical values of the estimates as

Card 1/2

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On the accumulation of computational errors S/794/62/000/001/001/010

such. It is assumed that after each arithmetic step the result is rounded up or down in such a manner that the relative error of rounding-off does not exceed ε or, in the most unfavorable case, may equal ε. Such a rounding-off method is essentially performed in machines with a floating decimal point. The examples discussed in detail comprise: (1) The accumulation of errors in the solution of the Cauchy problem, (2) accumulation of errors in the solution of a boundary problem by the "drop-out" method proposed by I. M. Gel'fand and O. V. Lokutsiyevskiy, (3) the bounds of the applicability of the "drop-out" method, (4) the accumulation of the computational error in the solution of the mixed problem for a heat-conductivity equation. There are 6 Russian-language Soviet references.

Card 2/2

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S/794/62/000/001/002/010

AUTHOR: Bakhvalov, N.S.

TITLE: On the determination of the initial step and the estimate of the principal error term in numerical integration with an automatic selection of the step.

SOURCE: Vychislitel'nyye metody i programmirovaniye; sbornik rabot Vychislitel'nogo tsentra Moskovskogo universiteta, no.1. Ed. by N. P. Trofonov, G. S. Roslyakov, and Ye. A. Zhogolev. [Moscow] Izd-vo Mosk. un-ta, 1962, 69-79.

TEXT: The present brief note investigates the possibilities of the use of the Runge rule in numerical integration with a variable step. The Runge rule, in which two different steps are used, permits one, in the numerical integration of differential equations with a constant step, to estimate the error of the result and to determine the maximal step that is adequate to obtain a solution with a prescribed accuracy ε. The problem considered is that of finding the solution $y(x)$ in the segment $[x_0, b]$ of the equation $y' = f(x, y)$ with the initial condition $y_{x=0} = y_0$. For the sake of simplicity, the investigation is limited to integration with the aid of formulas in which the value of the solution at a point x_{m+1} is determined by the magnitude of

Card 1/2

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the solution in the one point x_m only. Such formulas are those of Euler, the trapezoid, and Runge-Kutta, and - in the case of the solution of an equation $y'=f(x)$ - the formulas of the rectangle, trapezoid, Simpson, and other methods. The applicability of the Runge rule is proved, but it becomes evident - from the estimates made by G. Dahlquist (Stability and error bounds in numerical integrations of ordinary differential equations, Uppsala, 1959) - that in the integration of the equation $y'=-y$ with a constant step h the application of the Runge formula over a large integration interval is questionable. There are 6 references (5 Russian-language Soviet and the English-language Dahlquist paper).

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1019/1219

AUTHOR: Bakhvalov, N. S. (Moscow)

TITLE: On the optimal methods of giving information in solving the differential equations

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 2, no. 4, 1962, 569-592

TEXT: To solve the equation

$$u_t = P(t, x, u)$$

where $P(t, x, u)$ is some operator working on $u(t, x)$ for all fixed values of t, a solving method is chosen, and the class $W(t)$ of functions to which the solution $u(t, x)$ is determined.

The present work determines how the minimum quantity of information necessary to determine the functions of $W(t)$ with a precision of order ε varies with t. Let $W(t)$ be a closed compact and $N_\varepsilon(t)$ the number of elements of the minmum covering of $W(t)$ by sets of diameter 2ε, then

$$H_\varepsilon(t) = \log_2(N_\varepsilon(t))$$

is the ε-entropy of $W(t)$. The minimum of information or the minimum number $K_\varepsilon(t)$ of binary digits in equal to the smallest integer not smaller than $H_\varepsilon(t)$.

The following properties are illustrated in examples:

Card 1/3

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$$\text{If } \frac{d}{dt}\rho(u_1, u_2) \leqq 0 \quad \text{then } \frac{\partial H_\varepsilon}{\partial t} \leqq 0$$

$$\text{If } \frac{d}{dt}\rho(u_1, u_2) \geqq 0 \quad \text{then } \frac{\partial H_\varepsilon}{\partial t} \geqq 0$$

Here $\rho(u_1, u_2)$ is the distance between the solutions.

These relations do not explain how a value of a function from $W(t)$ is reestablished by the given information. In order to obtain more concrete methods for determining the solutions, some preciseness of a number of known asymptotic evaluations of H_ε are given. A category of classes of functions, appropriate for the evaluation of the number of digits necessary to determine the solution, is defined by the authors as the classes $\phi_\varepsilon^\rho(L(x), V, M_1, M_2)$ of functions $f(x)$ such that: 1) $|f(x)| \leqq M_1$; 2) for each $f(x)$ there exists $v(x) \in V$ and a number λ in absolute value not greater than M_2, such that $|f_{(\varepsilon)}(x) - \lambda V(x)| \leqq L(x)$; 3) for each $\gamma(x)$ in absolute values not greater than $L(x)$, there is a function $f(x) \in \phi_\varepsilon(L(x), V, M_1, M_2)$ such that $f^{(\varepsilon)}(x) = \gamma(x) + \lambda v(x)$ where $|\lambda| \leqq M_2$ and $v(x) \in V$; V is a set of functions, defined on $[0, \rho]$ and in absolute values not greater than λ, compact in the metric of C. If the segment $[0, \rho]$ is divided into m segments $[x_{k-1}, x_k]$ and the function $f(x) \in \phi_\varepsilon(L(x), V, M_1, M_2)$ is given independently in each segment with an error not greater than ε_k, we can choose ε_k in such a way that the principal term of the number of digits sufficient

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On the optimal methods...

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for giving $f(x)$ locally is identical with the principal term of the ε-entropy of the class $\phi_s(L(x), V, M_1, M_2)$. The existence and the differential equation for the density of the principal term of the ε-entropy is demonstrated. Some imperfections in the construction are pointed out. 1) The best (at least asymptotically) method of remembering the solutions are not given and excepting one case no coefficient of the asymptotical evaluation of H_ε is known. 2) there is no effective evaluation of the departure of the ε-entropy from its asymptotic value. These imperfections may not be essential when the functions are given by tables.

Card 3/3

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GODUNOV, Sergey Konstantinovich; RYABEN'KIY, Viktor Solomonovich. Prinimali uchastiya: BAKHVALOV, N.S.; KRYLOV, V.Yu.; BIRYUK, G.I., red.; PLAKSH, L.Yu., tekhn. red.

[Introduction to the theory of different systems]Vvedenie v teoriiu raznostnykh skhem. Moskva, Fizmatgiz, 1962. 340 p. (MIRA 16:1)

(Difference equations) (Operators (Mathematics))

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"APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000103110005-0

BAKHVALOV, N.S.

Imbedding theorems for classes of functions with several bounded derivatives. Vest.Mosk.un.Ser.1: Mat., mekh. 18 no.3:7-16 My-Je '63. (MIRA 16:6)

1. Kafedra vychislitel'noy matematiki Moskovskogo universiteta.
(Functions, Periodic)

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ACCESSION NR: AP4037246 S/0208/64/004/003/0399/0404

AUTHOR: Dakhvalov, N. S. (Moscow)

TITLE: Hypothesis of independence of round-off errors in numerical integration

SOURCE: Zhurnal vy*chislitel'noy matematiki i matematicheskoy fiziki, v. 4, no. 3, 1964, 399-404

TOPIC TAGS: round off error, numerical integration, independent random variables, error accumulation, quadrature, fixed point computation

ABSTRACT: The author investigates the joint distribution of error in numerical integration due to round-off and draws the conclusion that the joint distribution of the round-off error random variables is close to the joint distribution of pairwise independent random variables under certain conditions. It is also close to that of jointly uniformly distributed independent random variables under stronger conditions. This allows estimation of the overall error due to round-off. Orig. art. has: 12 formulas.

ASSOCIATION: none

SUBMITTED: 02Apr63 DATE ACQ: 09Jun64 ENCL: 00

SUB CODE: MA NO REF SOV: 002 OTHER: 000

Card 1/1

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