"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Cellulose as a raw material for the production of artificial fibers. I. Marchlewska. *Przegląd Tech.* 77, 427–31(1939).—A review with references. E. A. A.

ca

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COMMON ELEMENTS

COMMON MATERIALS INDEX

OPEN

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1ST AND 2ND LETTER

3RD AND 4TH ORDERS

5TH ORDER

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22

Industrial manufacture of woodpulp and paper in Poland. Jadwiga Marchlewska-Szrajerowa. *Chem. Obsor* 23, 185-9(1948). J. Micka

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA-SZRAJEROWA, J.

"Cellulose pulps for greaseproof paper" (P. 225). PRZEGLAD PAPIERNICZY (Centralny Zarzad Przemyslu Papierniczego i Stowarzyszenie Inzynierow i Technikow Przemysłu Papierniczego) Lodz, Vol. 9, No. 8, Aug. 1953.

SO: East European Accessions List, Vol 3, No. 8, Aug. 1954.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA-SZRAJEROWA, Jadwiga

Chemical Abstracts
Vol. 48 No. 5
Mar. 10, 1954
Cellulose and Paper

More about straw. Jadwiga Marchlewska-Szrajerowa. *Przegląd Papierniczy* 9, 300-3(1953).—The straw (I) pulp, which can be produced commercially by soda, sulfate, neutral sulfite, or soda-Cl (Celdecor) processes, can be successfully used in lieu of spruce (II) sulfite pulp in making various grades of paper. It is emphasized that the possibility of manuf. and use of I pulp in Poland should be given immediate consideration because I is a much cheaper raw material than II, and pulping of I requires less elec. power than pulping of II. T. R. Zerree

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA-SZRAJEROWA, J.

50 years of the School of Papermaking in Altenburg, German Democratic Republic. p. 55.
(PRZEGLAD PAPIERNICZY. Vol. 12, no. 2, Feb. 1956, Lodz, Poland)

SO: Monthly List of East European Accessions (EEAL) LC. Vol. 6, no. 12, Dec. 1957. Uncl.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA-SZRAJEROWA, J.

MARCHLEWSKA-SZRAJEROWA, J. Observation on the determination of impurities in paper. p. 306.
Rubber covering of rolls for printing lines on paper. p. 306.

Vol. 12, no. 10, Oct. 1956
PRZEGLAD PAPIERNICZY
PHILOSOPHY & RELIGION
Warszawa, Poland

SO: East European Accession, Vol. 6, No. 3, March 1957

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

2

Rice straw as a papermaking raw material in Hungary. Lech Boguslawski and Jadwiga Marchlewska-Szrajerowa. *Przegląd Papierniczy* 12, 321-5(1956).—Rice straw pulp of satisfactory quality was made at the pilot plant in Szolnok (Hungary) by kraft and neutral sulfite processes, the latter with no recovery of spent liquor. On the basis of the data obtained, a kraft mill of 70 tons/day bleached pulp capacity is planned. The pulp will be used as a part of furnish in several paper grades. T. R. Zegree

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

POLAND/Chemical Technology - Chemical Products and Their Application, Part 4. - Cellulose and Its Derivatives, Paper. H-33

Abs Jour : Ref Zhur - Khimiya, No 14, 1958, 48974

Author : J. Marchlewska-Szrajerowa

Inst : -

Title : Processing of Hardwood Pulp, in Particular of Beech, in France.

Orig Pub : Przegl. papiern., 1957, 13, No 9, 263-267

Abstract : Data concerning the utilization of hardwood pulp in the paper industry in France are presented. A general description of the French paper industry and of a factory of beech viscous cellulose is given.

Card 1/1

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

POLAND / Chemical Technology. Chemical Products and Their Applications. Cellulose and its Derivatives. Paper. H-33

Abs Jour: Ref Zhur-Khimiya, No 3, 1959, 10394.

Author : Marchlewska-Szrajerowa, J.
Inst : Not given.
Title : Prospects of Producing Cellulose for Synthetic Fibers in the Polish Peoples Republic.

Orig Pub: Przegl. papierm., 1958, 14, No 3, 72-75.

Abstract: Construction of 2 new enterprises in Poland is projected to produce these cellulose (C) trademarks: "Standart" for staple viscose fiber and sheets; "Super I" for synthetic viscose silk and ordinary cord; "Super II" for high quality cord and highly refined cellulose for acetate

Card 1/2

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

POLAND / Chemical Technology. Chemical Products and Their Applications. Cellulose and its Derivatives. Paper. H-33

Abs Jour: Ref Zhur-Khimiya, No 6, 1959, 18394.

Abstract: silk and sheets and C for paper production. By 1965 10 enterprises should be built to manufacture a woody mass-- white, chemical hemicellulose from foliate varieties and C for paper production. The demand for raw materials will be partly covered by importing wood pulp. -- Yu. Gurvich.

Card 2/2

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA, Jadwiga

Training the personnel of scientific-technical information service in the U.S.S.R. Akt probl inf dok 7 no.6:21-27 N-D '62.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA, Jadwiga, prof.,dr.

The 3rd international congress of historians of the paper industry. Przegl papier 18 no.1:28-29 Ja '62.

1. Centralny Instytut Informacji Naukowo-Technicznej i Ekonomicznej, Warszawa.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA, Jadwiga, prof. dr.

A direct method to obtain carbozylethylcellulose. Przegl papier 18 no.2:49-50 F '62.

1. Centralny Instutut Informacji Naukowo-Technicznej i Ekonomicznej, Warszawa.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA, Jadwiga, prof. dr

I. Bogdan has found connections existing between Polish and Hungarian paper manufacturers in the 16th century. Przegl papier 18 no.10:328 O '62.

1. Centralny Instytut Informacji Naukowo-Technicznej i Ekonomicznej, Warszawa.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA, Jadwiga, prof. dr

Paper during the carnival season. Przegl papier 19 no.1:25,28 Ja '63.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA-KOJ, Anna

Industrial melanism of insects as a problem of evolution. Kosmos biol 11 no.3:327-328 '62.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKA-KOJ, Anna

Electrophoretic investigations of haemoglobins in amphibia. Folia biol 11 no.2:167-172 '63.

1. Department of Evolution and Animal Genetics, Jagellonian University, Krakow.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHLEWSKI, Jan H.

Roe deer reared as hunting game in Denmark. Wszechswiat no.5: 114-115 My'61.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

Marcinkowski L.

2000

2810 547.5/.9

*Marcinkowski L. Organic Chemistry. Vol. 2. Cyclic Compounds.
„Chemia organiczna. Tom 2. Związki cykliczne". Warszawa, 1954, PWN, 16°, 330 pp.

The second volume raises for discussion: cyclic hydrocarbons and their derivatives; heterocyclic compounds; derivatives of arsenic and phosphorus and organo-metallic compounds; biologically important compounds.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

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[illegible], M.

"The [illegible]," [illegible] 1, ([illegible]), [illegible],
"[illegible]"

[illegible]: [illegible], [illegible], [illegible]
[illegible], 1953, [illegible].

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

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MARCHLEWSKI, Teodor DECEASED

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Jan.

1963/
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Genetics

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

SALACINSKI, Jozef; MARCHLIK, Tadeusz

Graphic Z-method of the synthesis of equalizing bridged T-network type networks. Lacznosc Gdansk no.12:89-101 '64.

1. Department of Wire Teletransmission of the Gdansk Technical University. Submitted May 5, 1964.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHNIAK, J.; SUKHAROWSKI, S.

Deadidifying crude oils.

p. 252 (Nafta) Vol. 13, No. 9, Sept. 1957, Krakow, Poland

SO: MONTHLY INDEX OF EAST EUROPEAN ACCESSIONS (EEAI) LC, VOL. 7, NO. 1, JAN. 1958

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHOWSKI, Tadeusz

For mechanizing the interoperational transportation in the furniture industry. Przem drzew 11 no.9:17-18 '60.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, A. A.

"Basic Procedures for Cultivating Alfalfa for Seed in Zhitomirskaya Oblast." Cand Agr Sci, Belotserkov Agricultural Inst, Min Higher Education USSR, Belaya Tserkov' 1955. (KL, No 8, Feb 55)

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

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

USSR / Cultivated Plants. Forage Crops. M-5

Abs Jour: Ref Zhur-Biol., 1958, No 16, 73010.

Author : Marchuk, A. A.
Inst : Not given.
Title : Some Problems of Lucerne Seed Growing.

Orig Pub: Byul. sil's'kogospod. inform. Zhitom. obl. vid. t-va dlya poshir. polit. ta nauk. znan', 1957, No 3, 71-74.

Abstract: According to experiments of the Zhitomirskiy Agricultural Institute, "Zaykevicha" and "Garbashevskaya" are the most promising varieties of lucerne for cultivation. To obtain seeds, it is better to use lucerne nursery crops under spring wheat or barley in spaced grass stands with a planting rate of about 12 kg/ha of seeds. Lucerne for seed can be raised also in grass stands with timothy. It

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

USSR / Cultivated Plants. Fodder Crops. M-5

Abs Jour : Ref Zhur - Biologiya, No 13, 1958, No. 58645

Author : Marchuk, A. A.
Inst : Zhitomir Agricultural Institute
Title : The Periods of Mowing Alfalfa to Obtain Seeds in Zhitomir Oblast'

Orig Pub : Nauchn. tr. Zhitomirsk. s.-kh. in-t, 1957, 4, 173-180

Abstract : Alfalfa gives the greatest yield of seeds in dry years after the first mowing, according to the experiments carried out at the training farm (uchkhoz) "Levkovka" during 1949 - 1953. In years with normal or abundant moisture during spring-summer period maximum yield takes place after the second mowing. The yield of seeds of alfalfa in the second mowing during a dry year such as 1950 was lower by 40%. During more favorable years (1952 - 1953), it was greater by 16 - 51% than at the

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USSR / Cultivated Plants. Fodder Crops. M-5

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, A.D. professor

Use of plasmol in therapeutic practice. Teor. i prak. fiz. kult., 18 no.10:795-796 '55. (MLRA 9:1)

1. Kiyevskii gosudarstvennyy institut fizicheskoy kul'tury.
(NERVOUS SYSTEM-DISEASES
ther., human blood prep. plasmol)
(SERUMTHERAPY, in various diseases,
nervous system dis., human blood prep. plasmol)

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, Aleksandr Ivanovich [Marchuk, O.I.]; IL'IN, Yuriy Ippolitovich; SIROTENKO, Ivan Dmitriyevich; TIKHONOVICH, Aleksandra Mikhaylovna [Tykhonovych, O.M.]; ZLOCHEVSKIY, S.V., otv.za vypusk; KUROCHKIN, F., vedushchiy red.; PATSALYUK, P., tekhn.red.

[Streets of Kiev; handbook as of May 1, 1958] Vulytsi Kyieva; dovidnyk za stanom na 1 travnia.1958 r. Kyiv, Derzh.vyd-vo tekhn.lit-ry URSR, 1958. 398 p. (MIRA 12:11)

1. Kiev. Mis'ka dovidkovo-informatsiina kontora.
(Kiev--Streets--Handbooks, manuals, etc.)

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, A.I.; MARUSHCHAK, G.N.

Case of preserved pregnancy in a patient with pulmonary and meningeal tuberculosis. Zdrav. Kazakh. 22 no.1:75-77 '62. (MIRA 15:3)

1. Iz Yuzhno-Kazakhstanskogo oblastnogo protivotuberkuleznogo dispansera.

(PREGNANCY, COMPLICATIONS OF)
(MENINGES--TUBERCULOSIS)
(TUBERCULOSIS)

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARUSHCHAK, G.N.; MALOBRODSKIY, V.I.; MARCHUK, A.I.

Intubation anesthesia in extrapleural pneumolysis. Zdravookhr. Kazakh. 23 no.1:70-72 '63 (MIRA 17:2)

1. Iz Chimkentskogo oblastnogo protivotuberkuleznogo dispansera.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, A.P., inzh.

Machine for riveting frames. Mekh. sil'. hosp. 14 no.5:28-29 My '63. (MIRA 16:10)

1. Cherkasskoye otdeleniye "Sil' gosptekhniki."

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, B.Ye.

Manufacture of electronic computers in capitalist countries. Biul. tekh.-ekon.inform.Gos.nauch.-issl.inst.nauch.i tekh.inform. 17 no. 1:100-103 '64. (MIRA 17:2)

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

L 2[illegible]-67 EWT(d)/EWP(1) IJP(c) BB/GG

ACC NR: AP6[illegible] SOURCE CODE: UR/0413/66/000/006/0098/0099

AUTHORS: Marchuk, B. Ye.; Pogushin, L. M.; Mikheyev, V. A.

ORG: none

TITLE: A device for the group input of information from punched cards to an electronic computer. Class 42, No. 179991 [Announced by Central Scientific Research Institute of the Ministry of the Means of Communications (Tsentral'nyy nauchno-issledovatel'skiy institut Ministerstva puteyy soobshchoniya)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 6, 1966, 98-99

TOPIC TAGS: punched card, computer input unit

ABSTRACT: This Author Certificate presents a device for the group input of information from punched cards to an electronic computer with a linear structure. The device implements the interruption of the machine operation and is designed to provide the possibility of random and independent changes of the parameters of the group input in the process of reading a large mass of punched cards. Registers are used in the device as the detectors of the current address, the numbers of the cells, and selection parameters which are stored in the memory. The input channels of the registers are connected through valves with the outputs of the triggers of the computer command register (see Fig. 1). The resolution inputs of the valves are connected with the separate outputs of the computer decoder.

UDC: 681.142

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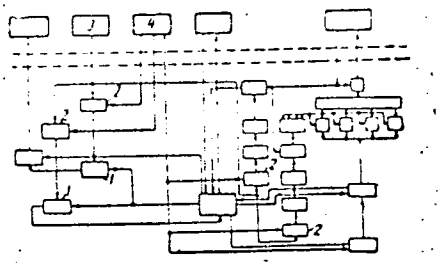
L 08944-67

ACC NR: AP6011258

Fig. 1. 1 - registers; 2 - valves; 3 - command register; 4 - decoder



Orig. art. has 1 figure.

SUB CODE: 09/ SUBM DATE: 10Feb64

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

S/035/62/000/012/056/064
A001/A101

AUTHORS: Sagitov, M. U., Marchuk, G. D.

TITLE: Eötvös correction for the effect of currents in marine gravity determinations.

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 12, 1962, 32, abstract 12G200 ("Geofiz. byul. Mezhduved. geofiz. kom-t pri Prezidiume AN SSSR", 1962, no. 11, 40 - 42)

TEXT: To take into account Eötvös correction, it is necessary to know velocity and direction of a current, determination of which presents considerable difficulties. The authors propose, in case when determinations of currents from a ship is impossible, to use charts of currents. Eötvös corrections determined by both methods are compared. The authors hold the opinion that current charts are unreliable, to be unjustified.

Yu. B.

[Abstracter's note: Complete translation]

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L 16896-65 EWT(1)/EWG(v) Po-4/Pe-5/Pq-4/Pg-4 GW
ACCESSION NR: AR4044502 S/0270/64/000/006/0030/0030

SOURCE: Ref. zh. Geodeziya. Otd. vy*p., Abs. 6.52.205

AUTHOR: Gladun, V.A., Marchuk, G.D., Panteleyev, V.L., Stroyev, P.A.

TITLE: Gravimetric investigations in the region of the Kurile-Kamchatka trench in the northwestern part of the Pacific Ocean

CITED SOURCE: Sb. Morsk. gravimetr. issledovaniya. Vy*p. 2. M., Mosk. un-t, 1962, 77-85

TOPIC TAGS: gravimetry, gravimetric survey, sea gravimeter, deep seismic sounding, Faye anomaly

TRANSLATION: In accordance with the plan for Soviet investigations under the International Geophysical Year program, the Tikhookeanskaya kompleksnaya geologo-geofizicheskaya ekspeditsiya (Pacific Ocean Complex Geological-Geophysical Expedition) was organized for a study of the Kurile-Kamchatka transition zone from the Asian continent to the Pacific Ocean. The expedition included three detachments of the Gosudarstvenny*y astronomicheskiy institut imeni P.K. Shternberga (State Astronomical Institute) and the Vsesoyuzny*y nauchno-issledovatel'skiy institut Geofiziki (All-Union Scientific

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ACCESSION NR: AR4044502

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Research Institute of Geophysics). In 1958 these detachments carried out gravimetric determinations in the investigated area along deep seismic sounding profiles and along three additional profiles. The survey was made with a four-pendulum sea gravimeter developed by the Tsentral'ny*y nauchno-issledovatel'skiy institut geodezii, aerofotos" yemki i kartografii (Central Scientific Research Institute of Geodesy, Aerial Mapping and Cartography) and 2 damped sea gravimeters designed at the All-Union Scientific Research Institute of Geophysics. At the same time, tests were made of a model of the SGP-2 string gravimeter developed at the All-Union Scientific Research Institute of Geophysics. The authors describe a method for gravimetric work at sea and office analysis of the measurement results and give an evaluation of accuracy. On one survey line (for the majority of the gravimetric stations), the mean square error of a Faye anomaly was ± 3.5 mgal; on the second line it was ±11 mgal. The mean square error of one gravity determination by damped gravimeters, on the basis of convergence of repeated observations, was ±4.5 mgal, on the basis of inner convergence of two gravimeters it was ± 3.1 mgal; and on the basis of convergence between gravimeters and pendulums it was ±5.0 mgal. The mean value of drift of the gravimeter null point along the survey lines fell in the range + 2 mgal/day. Bibliography with 9 items. P. Shokin.

SUB CODE: ES ENCL: 00

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L 39934-65 EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) JD

ACCESSION NR: AT5001792 S/2623/64/000/135/0030/0042

AUTHOR: Marchuk, G.D.

TITLE: The determination of the damping characteristics of marine gravimeters

SOURCE: Moscow. Universitet. Gosudarstvennyy astronomicheskiy institut. Soobshcheniya, no. 135, 1964, 30-42

TOPIC TAGS: gravity measurement, marine gravimeter, gravimeter damping, gravimeter pendulum

ABSTRACT: After discussing damping requirements historically and with respect to modern systems, the author sets up the differential equation for a gravimetric pendulum and solves it by the series method for the case of small deflections and a perturbing acceleration. The time constant is then defined so as to depend only on friction and the natural frequency of the gravimeter. The 'static' method of determining the time constant, by displacing it from equilibrium and analyzing the subsequent motion, is considered for displacements along the several axes. The equation of motion is solved from these cases and the relation of the solutions to the time constant is shown. The author disagrees with the method for calculating the coefficient of friction proposed by Romanyuk, which does not take into account the rate of angular change. This coefficient

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can be found from the formulas obtained by analyzing the static and dynamic methods. The evaluation is not exact, however, since the friction is assumed constant. Orig. art. has: 3 figures and 35 formulas.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: ES

NO REF SOV: 003 OTHER: 000

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

ACC NR: AT6028019 SOURCE CODE: UR/0000/63/000/000/0077/0085

AUTHOR: Gladun, V. A.; Marchuk, G. D.; Panteleyev, V. L.; Stroyev, P. A.

ORG: none

TITLE: Gravimetric investigations in the Region of the Kurile Kamchatka depression and the north-western Pacific in 1958

SOURCE: Moscow. Universitet. Astronomicheskiy institut. Geologicheskiy fakul'tet. Morskiye gravimetricheskiye issledovaniya; sbornik statey, no. 2, 1963, 77-85

TOPIC TAGS: geological zone, seismic method, gravimetric method, magnetic method, damped gravimeter, pendulum oscillation horizontal acceleration, vertical acceleration, gravity anomally, gravimetric survey, OCEAN DYNAMICS

ABSTRACT: The study of the Kurile-Kamchatkha geological zone included the sea of Okhotsk, Sakhalin, the Kurile Islands, southern Kamchatka, [illegible], and the Kurile-Kamchatka depression of the Pacific. Investigations were carried out by seismic, gravimetric, and magnetic methods. Deep sounding was [illegible] the northern part of the sea of Okhotsk, the northern Kurile Islands, and the [illegible] depression. One profile crossed the Aleutian arc. All soundings were [illegible] gravity measurements. Gravimetric measurements have been carried out with the marine-damped gravimeters of Soviet production. The four-pendulum apparatus was adapted for marine measurements in the Central Scientific Research Institute of Geodesy,

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Aerosurveying, and Cartography and equipped with a photo-recording [illegible] pendulum oscillations. Time measuremnts were made by a quartz clock. The [illegible] apparatus was suspended on gimbals. The recording of pendulum oscillations [illegible] 35 min at each marine observation point, and observations by the damped gravimeter were made simultaneously with those by the pendulum apparatus. The real error for all measurements was 11.9 mgl. The horizontal acceleration was computed from pendulum photographs of the long and short periods. Corrections to the vertical accelerations were determined by averaging the squares of amplitudes of the elastic horizontal pendulum. These corrections were checked by fluctuations in photographs of basic gravimetric pendulums and represented graphically in the original article. The accuracy of the measured gravity anomaly was determined by dividing errors into two grups, one included errors caused by instruments and methods, used and the other contained errors introduced by external circumstances, such as the position of the ship, the depth of the sea, the stream velocity, etc. The final error of the Faye anomaly was found to be equal to ±3.5 mgl. The mean error in measurements performed with damped gravimeters was equal to ±4.3 mgl due to the Bouguer anomaly. Orig. art. has: 1 figure 3 tables, and 28 formulas.

SUB CODE: 08/ SUBM DATE: 22Nov63/ ORIG REF: 009

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, G. I.

2

Approximation methods for calculations for nuclear reactors. G. I. Marchuk. *Sessiya Akad. Nauk. S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk* 1955, 371–4.—A general discussion. In the expts. done in U.S.S.R. mostly U-graphite lattices were used for the detn. of η_{eff}, and the approximation formulas used here did not give rise to any trouble, as the results were within the precision of the measurement (about ±3%).

Werner Jacobson

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

ПИРЕЧНИК, Г. И.

Category : USSR/Nuclear Physics - Nuclear Engineering and Power C-8

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6103

Author : Nerchuk, G.I.
Title : [redacted] of Designing a Reactor for an Atomic Electric Station.

Orig Pub : Atom. energiya, 1956, No 2, 11-20

Abstract : A survey of the methods used to design the reactor of the atomic electric station of the Academy of Sciences of the USSR. is given. In particular, a consideration is given to the solution of the boundary problems with the aid of difference factorization which consists of replacing one second-order difference equation by three first-order difference equations. Graphs are given for the spatial-energy distributions of the neutron fluxes and values, (conjugated function) for individual cells and for the reactor as a whole. V.V. Orlov's equation for the resonance escape probability, pertaining to the cell of the atomic electric station reactor is given, as are graphs for the functions contained in this formula.

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, G. I., PUPKO, V. Y., POGUDALINA, E. L., SMELOV, V. V., TUTEREV, I. P., PLATONOVA, S. P. and DRUZHININA, G. I.

"Nuclear Reactor Physical Problems and Calculation Methods."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

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PHASE I BOOK EXPLOITATION 774

Marchuk, Guriy Ivanovich, Dr. of Physical and Mathematical Sciences

Chislennyye metody rascheta yadernykh reaktorov (Numerical Methods of Calculation for Nuclear Reactors) Moscow, Atomizdat, 1958. 381 p. (Series: Atomnaya energiya. Prilozheniye, 1958, no. 3-4) 7,760 copies printed.

Ed.: Alyab'yev, A. F.; Tech. Ed.: Mazel', Ye. I.

PURPOSE: The book is intended for university students majoring in physics, graduate students, and engineers and scientists specializing in the design of nuclear reactors. The author states that familiarization with basic reactor theory on the level of S. Glasstone and M. G. Edlund's "Elements of Nuclear Reactor Theory" (New York, 1952) is necessary.

COVERAGE: The author outlines the basic problems connected with numerical methods for the design of nuclear reactors, stressing various practical applications. Particular attention is devoted to problems of critical mass, space-energy flow distribution, and the value of neutrons. The book gives effective methods for reducing basic and conjugate reactor equations to a system of multi-group diffusion equations that are subsequently solved successfully by the difference factorization method. Perturbation theory is applied in calculating

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small effects. The design of heterogenous reactors by effective homogenization methods is given a prominent place. In discussing fast neutron reactors, considerable attention is given to numerical methods of solving kinetic equations. The numerical methods of calculations for nuclear reactors were developed in 1955-1956 by the author in collaboration with Ye. I. Pogudalina, E. S. Maksimova, V. V. Smelov, G. A. Ilyasova, I. P. Markelov, I. P. Tyuterev and others. All these methods were first thoroughly tested and later put into practice. These methods were further developed and improved by a group of physicists under the supervision of A. I. Leypunskiy, Member, Academy of Sciences, Ukrainian SSR, to whom the author is indebted for valuable comments made throughout the writing of the book. Other personalities mentioned include: L. N. Usachev and A. S. Romanovich, who assisted in the solving of new mathematical problems; V. Ya. Pupko, V. A. Kuznetsov, B. F. Gromov, G. I. Toshinskiy, N. I. Buleyev, S. D. Shikhov, V. V. Orlov, T. Kh. Sidel'nikov (kinetics of reactors and the perturbation theory); D. I. Blokhintsev and Ye. S. Kuznetsov (helpful in discussing various aspects of the theory and methods of reactor design); and scientific workers Zh. N. Bel'skaya, N. P. Kochubey, and A. I. Vaskin, who helped in the preparation of the manuscript for publication. The book contains

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

AUTHOR: Marchuk, G.I. 89 -1-2/18

TITLE: The Diffusion Equation With Finite Differences (Konechno-raznostnyye uravneniya diffuzii).

PERIODICAL: Physics and Thermotechniques of Reactors (Fizika i teplotekhnika reaktorov), Supplement Nr 1 to Atomnaya energiya, 1958, (USSR)

ABSTRACT: The solution of the diffusion differential equations, also for the most simple domains, is particularly difficult, above all, in the case of numerical computation. Therefore, this method is not suitable, particularly if computation has to be carried out in series.

The equations can be solved with much greater effect by the method of finite differences. The essential feature of this method consists in the fact that the differential operator is replaced by finite differences.

In the following 5 chapters the methods of solution are theoretically derived and given:

1.) General method for diffusion equations with finite differences for a one-dimensional domain.

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The Diffusion Equation With Finite Differences 89 -1-2/18

2.) The most simple diffusion equation with finite differences.
3.) Improved diffusion equation with finite differences.
4.) The most simple diffusion equation with finite differences for a two-dimensional domain.
5.) Improved diffusion equation with finite differences for a two-dimensional domain.

There are 10 references, 7 of which are Slavic.

AVAILABLE: Library of Congress

Card 2/2 1. Differential equations-Applications

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

AUTHOR: Marchuk, G.I. 89-1-1/18

TITLE: The Problem of Calculating Nuclear Reactors by the Multigroup Method (K voprosu o mnogogruppovom metode rascheta yadernykh reaktorov).

PERIODICAL: Physics and Thermotechniques of Reactors (Fizika i teplotekhnika reaktorov), Supplement Nr 1 to Atomnaya energiya, 1958, (USSR)

ABSTRACT: In the case of a weak absorption of the neutrons to be slowed down the slowing down density q changes only little with lethargy. It is therefore sufficient, when solving a multigroup system to take into account a limited number of energy groups. The matter is entirely different if a zone of strong absorption of the neutrons to be slowed down exists in the reactor, because the function q may vary considerably as a result of the neutron absorption in the unit interval of lethargy.
In order to attain one's aim with the required accuracy of calculation, the number of energy groups might be increased. This, however, leads to a considerable increase of work in numerical computation.
A method is derived that is applicable both to the system of

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principal- and to that of reactor boundary equations.
In the first chapter of this paper the multigroup system of the reactor equations is dealt with and the determination of q is derived.
In the second chapter the same processes of computation are applied to the reactor boundary equations. There are 7 tables, and 8 references, 6 of which are Slavic.

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Card 2/2 1. Reactors-Mathematical analysis 2. Nuclear physics-USSR

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S/124/60/000/008/007/011
A005/A001

3.500

Translation from: Referativnyy zhurnal, Mekhanika, 1960, No. 8, p. 93, # 10403

AUTHORS: Buleyev, N. I., Marchuk, G. I.

TITLE: On the Dynamics of Large-Scale Atmospheric Processes

PERIODICAL: Tr. In-ta fiz. atmosf. AN SSSR, 1958, No. 2, pp. 66-104

TEXT: The work was performed in 1951. The formulation and complete solution are presented of the problem of short-range forecast in the baroclinic atmosphere to a quasigeostrophic approximation. The authors follow the meteorologinsts of the Fridman-Kochin school and use the vorticity transfer equation as a starting correlation. This equation was subjected to various transformations in connection with the allowance for the quasistatic and quasigeostrophic nature of atmospheric motions of the scale considered. This equation, together with the equations of heat supply and statics, forms a system with three unknown functions, which are: the altitude of absolute topography z, the temperature T, and the vertical speed τ in the p-system. The solution of this equation system is given with respect to $\partial z/\partial t$, $\partial T/\partial t$, and τ. It is most general in comparison with the solutions, which were established in earlier publications of

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On the Dynamics of Large-Scale Atmospheric Processes

I. A. Kibel' (1950) and N. I. Buleyev (1950), who made certain restrictions. In the present work, the solution is obtained by the Fourier-Bessel method and is expressed through the magnitudes of vortex advection and temperature advection integrated over the entire space with weights determined by the Green functions. The authors obtained these functions in analytic formulation; they are tabulated and added graphically. The working formulae obtained may be used for practical calculations in connection with the forecast of the meteorological elements with the aid of computers as well as other (graphical) methods. The detailed analysis of the formulae obtained is carried out as regards to elucidation of the significance of the individual factors affecting the variation of the pressure and formation of vertical currents at various atmospheric levels. In particular, the conditions are elucidated, which provide for the existence of a "medial level" in the atmosphere, as well as the dependence of the altitude of this level on the disturbance scale. The work has also methodical significance. The method developed by the authors can be applied also to certain other problems in the region of hydrodynamic methods of short-range weather forecast.

S. L. Belousov

Translator's note: This is the full translation of the original Russian abstract.

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

S/169/60/000/007/003/016
A005/A001

Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 7, p. 140, # 7981

AUTHOR: Marchuk, G.I.

TITLE: On Large-Scale Thermohydrodynamic Processes in the Baroclinic Atmosphere

PERIODICAL: Tr. in-ta fiz. atmosf. AN SSSR, 1958, No. 2, pp. 119-141

TEXT: The propagation processes of disturbances in the 1,000 mb surface and at other altitudes were studied to elucidate the interaction of processes occurring at various levels of the baroclinic atmosphere. A detailed derivation of the fundamental equations of thermohydrodynamics of the baroclinic atmosphere is given in a quasigeostrophic approximation. Having eliminated the vertical velocity, utilizing the boundary conditions, and having linearized the equations with respect to the west-east current, they are written in the form:

$$\int_0^1 \left\{ \frac{\partial \Delta z'}{\partial t} - \frac{g}{e} \frac{\partial \bar{z}}{\partial y} \frac{\partial \Delta z'}{\partial x} + \beta \frac{\partial z'}{\partial x} \right\} d\zeta = 0 \qquad (1)$$

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

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On Large-Scale Thermohydrodynamic Processes in the Baroclinic Atmosphere

$$\frac{\partial T}{\partial t} - \frac{g}{e}\left[\overline{\frac{\partial z}{\partial y}}\,\frac{\partial T'}{\partial x} + \frac{g}{R}\zeta\frac{\partial}{\partial \zeta}\left(\overline{\frac{oz}{oy}}\right)\cdot\frac{\partial z'}{\partial x}\right] = 0 \qquad (2)$$

$$z' = z_0 + \frac{R}{g}\int_{\zeta}^{1} T'\,\frac{d\zeta}{\zeta} \qquad (3)$$

here z_0 is the altitude AT 1,000 mb above the sea level, and $\zeta = \frac{p}{P}$. The system (1-3) can be solved in the following way: first the solution of the system (1,2) is sought assuming that the function z_0 is known, then the found solution is inserted into (3), from which the form of the boundary function z_0 (x,y,t) may be determined. For determining the function $z(x,y,\zeta,t)$ the equation

$$\frac{\partial^2 z}{\partial t\, d\zeta} + U(\zeta)\,\frac{\partial^2 z}{\partial x\, d\zeta} - \frac{dU}{d\zeta}\,\frac{\partial z}{\partial x} = 0$$

will be obtained after some transformations, where $U(\zeta)$ is the velocity of the west-east transfer. By introducing $U = U(\zeta)$ as independent variable, we will succeed in obtaining the general integral of equation (4). The equation for determining z_0 can be solved by the Fourier method. The study of the interaction

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

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A005/A001

On Large-Scale Thermohydrodynamic Processes in the Baroclinic Atmosphere

of the hydrodynamic processes, which develop at various levels of the atmosphere, showed that the local variations of the velocity vortex with time at the 1,000-mb surface depend in the main on the nature of the meteorologic elements in the lower and middle troposphere; disturbances in the velocity vortex field in the troposphere and the lower stratosphere show an effect opposite in sign on the local cyclogenesis near the earth; variations of $\partial\Omega/\partial x$ at the given troposphere level cause local variations of the vortex field of the same sign in layers lower than this level, as well as in the stratosphere, and those of opposite sign in the troposphere layers above the level considered. The stability of the solutions of the linearized equations for the baroclinic atmosphere was studied. A criterion is obtained for the stability of the equation solutions, depending on the length of disturbance wave, the change of the Coriolis parameter with respect to latitude, and the vertical velocity slope of the west-east transfer. The effect of the horizontal macroturbulence transfer on the stability of atmospheric motions was cleared up. A criterion for the stability of the solution of the thermohydro-

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S/169/60/000/007/003/016
A005/A001

On Large-Scale Thermohydrodynamic Processes in the Baroclinic Atmosphere

dynamic equations was obtained under consideration of the factors of macro-turbulent transfer. The work was concluded in 1951.

G.P. Kurbatkin

Translator's note: This is the full translation of the original Russian abstract.

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APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2"

"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

AUTHORS: Marchuk, G.I., Mikhaylus, F.F. SOV/89-4-6-3/30

TITLE: The Resonance Absorption of Neutrons in an Infinite Uniform Medium (Rezonansnoye pogloshcheniye neytronov v beskonechnoy odnorodnoy srede)

PERIODICAL: Atomnaya energiya, 1958, Vol 4, Nr 6, pp 520-530 (USSR)

ABSTRACT: Moderation of neutrons takes place in an infinite uniform medium which has strong resonance absorption and in which neutron sources are uniformly distributed. Solution of the adjoint equation is an expression for the probability that a neutron with the energy E is not subjected to resonant capture during the process of moderation up to a certain asymptotic energy.
The scattering function of the neutrons in the described medium is first set up, after which the adjoint equation for neutron moderation is derived.
A method for the numerical solution of the moderation equation and the adjoint equation is then given.
In an example the method developed is applied to the first resonance level of U^{238} (E_0 = 6.7 eV) both for pure uranium and for uranium oxide.

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

The Resonance Absorption of Neutrons in an Infinite Uniform Medium 307/ 89-4-6-3/30

Solution of the fundamental and adjoint problem makes it possible to apply the perturbation functional for the influence exercised by Doppler broadening upon the resonance integral.
The following values of the resonance integral for the first resonance level of U^{238} are given:

	$J = - \ln q\ (u_{as})$ Pure U^{238}	UO_2
According to the exact solution of the fundamental equation	52.59	3.088
According to Fermi's approximation	818	20.04
According to Wigner's approximation	31.3	3.140
According to the Greiling-Gertzel approximation	39.2	5.188
According to the solution of the adjoint equation	52.66	3.084

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

The Resonance Absorption of Neutrons in an Infinite Uniform Medium

SOV/ 89-4-6-3/30

$J = -\ln q\,(u_{as})$

	Pure U^{238}	UO_2
In consideration of Doppler broadening	52.59 (T=0°K)	3.09
	51.12 (T=419°K)	3.28
	50.93 (T=655°K)	3.31
Calculated according to the perturbation theory	51.04 (T=419°K)	3.23
	50.89 (T=655°K)	3.26

There are 3 figures, 2 tables and 5 references, 3 of which are Soviet.

SUBMITTED: December 20, 1957

1. Neutrons--Absorption 2. Neutron absorbers--Theory 3. Perturbation theory--Applications 4. Mathematics--Applications

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MARCHUK, G.I.

21(4) PHASE I BOOK EXPLOITATION SOV/2583

International Conference on the Peaceful Uses of Atomic Engergy. 2nd, Geneva, 1958.

Doklady sovetskikh uchenykh; yadernyye reaktory i yadernaya energetika. (Reports of Soviet Scientists; Nuclear Reactors and Nuclear Power) Moscow, Atomizdat, 1959. 707 p. (Series: Its: Trudy, vol. 2) Errata slip inserted. 8,000 copies printed.

General Eds.: N.A. Dollezhal, Corresponding Member, USSR Academy of Sciences, A.K. Krasin, Doctor of Physical and Mathematical Sciences, A.I. Leypunskiy, Member, Ukrainian SSR Academy of Sciences, I.I. Novikov, Corresponding Member, USSR Academy of Sciences, and V.S. Fursov, Doctor of Physical and Mathematical Sciences; Ed.: A.F. Alyab'yev; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This book is intended for scientists and engineers engaged in reactor designing, as well as for professors and students of higher technical schools where reactor design is taught.

COVERAGE: This is the second volume of a six-volume collection on the peaceful use of atomic energy. The six volumes contain the reports presented by Soviet scientists at the Second International Conference on Peaceful Uses of Atomic Energy, held from September 1 to 13, 1958 in Geneva. Volume 2 consists of three parts. The first is devoted to atomic power plants under construction in the Soviet Union; the second to experimental and research reactors, the experiments carried out on them, and the work to improve them; and the third, which is predominantly theoretical, to problems of nuclear reactor physics and construction engineering. Yu. I. Moryakin is the science editor of this volume. See SOV/2081 for titles of all volumes of the set. References appear at the end of the articles.

Nostovoy, V.I., V.S. Dikarev, M.B. Yegizarov, and Yu. S. Saltykov. Measuring Neutron Spectra in Uranium Water Lattices (Report No. 2152) 546

Krasin, A.K., B.G. Dubovskiy, M.N. Lantsov, Yu.Yu. Glazkov, R.K. Goncharov, A.V. Kamayev, L.A. Geraseva, V.V. Vavilov, Ye. I. Inyutin, and A.P. Senchenkov. Studying the Physical Characteristics of a Beryllium-moderator Reactor (Report No. 2146) 555

Galanin, A.D., S.A. Nemirovskaya, A.P. Rudik, Yu. G. Abov, V.F. Belkin, and P.A. Krupchitskiy. Critical Experiment on an Experimental Heavy-water Reactor (Report No. 2036) 570

Marchuk, G.I., V. Ya. Pupko, Ye. I. Fogudalina, V.V. Smelov, I.P. Tyutekev, S.T. Platonova, and G.I. Druzhinina. Certain Problems in Nuclear Reactor Physics and Methods of Calculating Them (Report No. 2151) 588

Sinyutin, G.V. and V.N. Semenov. Determination of Control Rod Effectiveness in a Cylindrical Reactor (Report No. 2469) 613

Gel'fand, I.M., S.M. Feynberg, A.S. Frolov, and N.N. Chentsov. Using the Monte Carlo Method of Random Sampling for Solving the Kinetic Equation (Report No. 2141) 628

Laletin, N.I. Neutron Distribution in a Heterogeneous Medium (Report No. 2189) 634

Kazarnovskiy, M.V., A.V. Stepanov, and F.L. Shapiro. Neutron Thermalization and Diffusion in Heavy Media (Report No. 2148) 651

Veynik, A.I., V.S. Yermakov, and A.V. Lykov. Using the Onsager Theory for Studying Neutron Diffusion in the Absorbing Media of Nuclear Reactors (Report No. 2224) 668

Broder, D.L., S.A. Kurkin, A.A. Kutuzov, V.V. Levin, and V.V. Orlov. Studying the Spatial and Energy Distribution of Neutrons in Different Media (Report No. 2147) 674

Dmitriyev, A.B. Boron Ionization Chambers for Work in Nuclear Reactors (Report No. 2084) 690

Kirillin, V.A., and S.A. Ulybin. Experimental Determination of Specific Volumes of Heavy Water in a Wide Temperature and Pressure Range (Report No. 2471) 696

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, G. I.

3(7)

AUTHOR: Popov, L. I. SOV/50-59-4-19/21

TITLE: International Congress of Geophysicists (Mezhdunarodnaya Assambleya geofizikov)

PERIODICAL: Meteorologiya i gidrologiya, 1959, Nr 4, pp 74-77 (USSR)

ABSTRACT: From July 1, 1957 to December 31, 1958, investigations of our planet were carried out by scientists of 65 countries under the program of the International Geophysical Year (IGY). The 5th Congress of the Special Committee on the International Geophysical Year from July 29 to August 9, 1958 in Moscow was dedicated to the execution of these measures. A short survey of this Congress is given here.-The suggestion by A. A. Zolotukhin on a world-wide organisation of evaluations of meteorological data of the IGY in form of synoptic daily world maps, maps of the southern and northern hemispheres, and of vertical sections of the atmosphere, was discussed. The Study Group of Meteorology carried out the following work: on numerical methods of weather forecasts (conducted by I. A. Kibel', Corresponding Member of the AS USSR), on luminous night clouds (conducted by Professor V. V. Sharonov), on meteorology in the Antarctic (conducted by Professor B. L. Dmitriyevskiy). A. D. Chukhov, Corresponding Member of the AS USSR, and A. M. Kovin (Moscow) delivered a report on the theory of the adjustment of quasistatic and quasigeostrophic conditions in the atmosphere for a linear case, and put forward the results of a number of investigations in this direction. I. A. Kibel', Corresponding Member of the AS USSR, and V. P. Sedokov (Moscow), reported on the forecasts of temperature on the earth's surface with help of hydrodynamic methods, and for the first time put forward a scheme for the solution of the quasistatic-quasigeostrophic system of equations for the forecast in consideration of the turbulent heat conductivity. N. I. Balayev and G. I. Marchuk (Moscow) put forward a new iteration method for the solution of finite difference equations typical for the tasks of the numerical short-termed forecast. Professor M. I. Yudin (Leningrad) suggested some alterations of the forecast equations, thus reducing the area of influence considered in the forecast. He pointed out the necessity of thoroughly testing the methods worked out by many investigators (M. Ye. Kochin and A. A. Dorodnitsyn) for the consideration of the influence of the non-adiabatic factors and of large mountain ranges. O. G. Krichak (USSR) delivered a report on "The Characteristics of the Circulation in the Atmosphere Over the Antarctic and the Relationship of This Circulation With the Processes on the Southern Hemisphere".

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MARCHUK, G. I.

PHASE I BOOK EXPLOITATION SOV/5297

Akademiya nauk SSSR. Institut prikladnoy geofiziki.

Voprosy dinamicheskoy meteorologii (Problems of Dynamic Meteorology) Moscow, Izd-vo AN SSSR, 1960. 65 p. 1,500 copies printed.

Resp. Ed.: I.A. Kibel', Corresponding Member AS USSR; Eds. of Publishing House: K.P. Gurov and V.G. Berkgaut; Tech. Ed.: Yu.V. Rylina.

PURPOSE: This publication is intended for meteorologists.

COVERAGE: This collection of 4 articles discusses problems in short- and long-range weather forecasting, the theory of climate, transformation of air masses, the effect of free surfaces on the periods of long waves accompanying planetary atmospheric movements, and the theory of quasi-stationary planetary disturbances. All the articles were written between 1950-1953, and each is accompanied by references. A summary of the contents, written by I.A. Kibel', follows the last paper. No personalities are mentioned.

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Problems of Dynamic Meteorology SOV/5297

TABLE OF CONTENTS:

Blinova, Ye.N. On the Problem of Accounting for Air Temperature Transformations in Constructing a Thermohydrodynamic Forecast of Meteorological Elements 3

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AUTHOR: Buleyev, N.I., Marchuk, G.I.

TITLE: On the numerical solution of the equations of atmospheric dynamics

PERIODICAL: Referativnyy zhurnal, Matematika, no. 10, 1960, 177, abstract 12125.(In sb.: Nekotoryye probl.meteorol. No.1. M., AN SSSR, 1960, 13-23)

TEXT: By approximation of the differential equations of the atmospheric dynamics one obtains a system of two-dimensional elliptic net equations

$$a_{ik}\varphi_{i-1,k}-c_{ik}\varphi_{i+1,k}-b_{ik}\varphi_{i,k-1}-d_{ik}\varphi_{i,k+1}+p_{ik}\varphi_{ik} = f_{ik}$$

$$(0 < a_{ik}+b_{ik}+c_{ik}+d_{ik} \leqslant p_{ik}) \qquad (1)$$

The authors solve this system with the aid of the following iteration:

$$z_{ik} = \alpha_{ik}z_{i-1,k}+\beta_{ik}z_{i,k-1}+\gamma_{ik}\psi_{ik}+\gamma_{ik}f_{ik}, \qquad (2)$$

$$w_{ik} = \zeta_{ik}w_{i+1,k}+\delta_{ik}w_{i,k+1}+z_{ik}, \qquad (3)$$

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$$\varphi_{ik}^{(n+1)} = (1/p_{ik}\gamma_{ik})(\alpha_{ik}\psi_{i-1,k}+\beta_{ik}\psi_{i,k+1} + \zeta_{ik}\psi_{i+1,k}+\delta_{ik}\psi_{i,k+1}+\gamma_{ik}f_{ik}), \quad (4)$$

where $\alpha_{ik} = a_{ik}\gamma_{ik}$, $\beta_{ik} = b_{ik}\gamma_{ik}$, $\zeta_{ik} = c_{ik}\gamma_{ik}$, $\delta_{ik} = d_{ik}\gamma_{ik}$, $\psi_{ik} = r_{ik}\varphi_{i-1,k+1}^{(n)}+s_{ik}\varphi_{i+1,k-1}^{(n)}-\theta_{ik}(r_{ik}+s_{ik})\varphi_{ik}^{(n)}$, $r_{ik}= (1/\gamma_{ik})\alpha_{ik}\delta_{i-1}$, $s_{ik} = (1/\gamma_{ik})\beta_{ik}\zeta_{i,k-1}$, $\gamma_{ik}^{-1} = p_{ik}-a_{ik}(c_{i-1,k}+\theta_{ik}d_{i-1,k})\gamma_{i-1,k}-b_{ik}\times(d_{i,k-1}+\theta_{ik}c_{i,k-1})\gamma_{i,k-1}$, $0\leqslant\theta_{ik}\leqslant 1$.

The basic idea of this method is the transition from the difference equation of second order (1) to the system of difference equations of first order (2) and (3) (incomplete factorization). The equations (2) and (3) are stable because of the inequalities $\zeta_{ik}+\delta_{ik}<1$, $\alpha_{ik}+\beta_{ik}<1$. The equation (4) corresponds to the method of Libman. The velocity of convergence of the method (2)-(4) is the higher, the stronger the magnitude $a_{ik}+b_{ik}+c_{ik}+d_{ik}$ differs from p_{ik} and the larger

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is θ_{ik}. For large θ_{ik}, however, the method (2)-(4) can diverge. The convergence of the method (2)-(4) is rigorously proved only for $\theta_{ik}=0$. The method (2)-(4) has been generalized by the authors to the three-dimensional case.

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MARCHUK, G.I.; ILYASOVA, G.A.; KOLESOV, V.Ye.; KOCHERGIN, V.P.; KUZNETSOVA, L.I.; POGUDALINA, Ye.I.

[Critical masses of uranium - beryllium reactors] Kriticheskie massy uran-berillievykh reaktorov. Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 8 p. (MIRA 17:1)

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

MARCHUK, G.I.; KOCHERGIN, V.P.

[Approximate method for calculating the critical masses of shperical reactors with infinite reflectors] Priblizhennyi metod rascheta kriticheskikh mass sfericheskikh reaktorov s beskonechnym otrazhatelem. Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 12 p. (MIRA 17:1)

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MARCHUK, G.I.; ILYASOVA, G.A.; KOLESOV, V.Ye.; KOCHERGIN, V.P.; KUZNETSOVA, L.P.

[Critical mass of aqueous mixtures of uranium and plutnoim compounds] Kriticheskie massy vodnykh smesei soedinenii urana i plutoniia. Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 23 p. (MIRA 17:1)
(Uranium compounds) (Plutonium compounds)

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MARCHUK, G. I.

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PHASE I BOOK EXPLOITATION SOV/5337

Panasenkova, Ye. I., ed.

Issledovaniya kriticheskikh parametrov reaktornykh sistem; sbornik statey (Study of Critical Parameters of Reactor Systems; Collection of Articles) Moscow, Gosatomizdat, 1960. 117 p. Errata slip inserted. 3,600 copies printed.

Tech. Ed.: N.A. Vlasova.

PURPOSE: This collection of articles is intended for nuclear physicists and engineers of nuclear power plants.

COVERAGE: The book contains previously unpublished original articles concerned with the theoretical calculation of neutron fluxes and of critical parameters (critical masses and volumes) of various reactor systems: uranium-graphite, uranium-beryllium, and water mixtures of uranium and plutonium. Individual articles present tables and graphs used in the determination of the dependence of critical parameters on the relative concentration and the character of the fissionable material and the moderator, as well as on fuel enrichment for a wide range of neutron energy spectra. The following are mentioned: P.A. Gavrilov (scientific editor of the collection), and S.I. Sokolov, L.N. Spakhova,

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A. Ya. Ryumina, R.P. Roschina and V.S. Vladimirov (compilers of Table 1, table of values of coefficients k, D_0 and Υ). References accompany individual articles.

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MARCHUK, G. I.

" A review of calculations methods for fast and intermediate reactors.

report submitted for the IAEA Seminar on the Physics of Fast and Intermediate Reactors, Vienna, 3-11 Aug 1961

Acad. Sci. USSR, Moscow

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PHASE I BOOK EXPLOITATION SOV/5906

Marchuk, Guriy Ivanovich

Metody rascheta yadernykh reaktorov (Design Computation Methods for Reactors) Moscow, Atomizdat, 1961. 668 p. Errata slip inserted. 6,000 copies printed.

Ed.: L. I. Voronova; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This book is intended for physics students, scientific workers, and engineers specializing in atomic-power engineering.

COVERAGE: The book presents the principal physics calculation methods for atomic reactors. Algorithms are worked out for the practical application of mathematical methods in solving problems involved in the design of experimental atomic installations and atomic power plants. Emphasis is placed on the mathematical description of processes taking place in the reactor. Precomputed critical mass values, intended for practical reference, are included.

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Design Computation Methods for Reactors SOV/5906

Probable trends in the further development of reactor computation methods have been considered in the arrangement and presentation of the materials of the present book. The author thanks Academician A. I. Leypunskiy [AS UkrSSR] for his clarifications of theoretical questions, and acknowledges the collaboration or assistance of the following: Sh. S. Nikolayshvili, Ye. I. Pogudalina, V. V. Smelov, G. A. Ilyasova, F. F. Mikhaylus, V. P. Kochergin, A. I. Vaskin, V. P. Il'in, B. L. Gavrilin, V. V. Vakhromeyeva, Z. N. Milyutina, V. S. Vladimirov, Ye. S. Kuznetsov, N. N. Yanenko, N. I. Buleyev, A. I. Nevinnitsa, and O. P. Uznadze, theoretical physicists. L. N. Usachev, V. V. Orlov, T. N. Zubarev, S. B. Shikhov, V. F. Turchin (author of Ch. 28), V. Ya. Pupko, Ya. V. Shevelev, B. F. Gromov, G. I. Toshinskiy, and V. V. Chekunov; and experimental physicists I. I. Bondarenko, V. A. Kuznetsov, V. I. Mostov, B. G. Dubovskiy, A. I. Mogil'ner, M. B. Yegiazarov, V. S. Dikarev, and E. A. Stumbur. There are 318 references 231 Soviet (including 23 translations), 78 English, 5 German, 3 French, and 1 Italian.

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Design Computation Methods for Reactors SOV/5906

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AUTHOR: Marchuk, G. I.

TITLE: Review of nuclear reactor calculation methods

PERIODICAL: Atomnaya energiya, v. 11, no. 4, 1961, 356 - 369

TEXT: A detailed survey is given of the most common methods for reactor calculation published between 1939 and 1961. Also the main computation programs carried out in the USSR by means of electronic computers, such as "Strela", "Ural", and БЭСМ-2 (BESM-2), are described in brief. They are: (1) A 25-group computation program for any linear geometry in P_1 approximation. Elastic and inelastic neutron scattering, resonance effects, and neutron thermalization are taken into account (2) A program for solving a 25-group set of conjugate equations in P_1 approximation for one-dimensional reactors in plane, cylindrical, or spherical geometry. (3) A program for calculating the critical reactor size and the neutron flux in P_2 approximation for 25 groups. (4) Calculation of a reactor in linear geometry and P_3 approximation. (5) Calculation of the compensating power

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Review of nuclear reactor...

of control rods (25 groups, 9 reactor zones). (6) A program for calculating a heterogeneous reactor using the effective homogenization and Wigner-Seitz methods in P_3 approximation. (7) Calculation of the resonance integral with allowance for nuclear thermal motion. (8) Reactor calculation when slowing-down neutron absorption is taken into account (18 groups, 3 zones, 50 points; programming done by G. I. Marchuk, V. P. Kochergin, Ye. I. Pogudalina, L. I. Kuznetsova, T. I. Zhuravleva, V. V. Smelov, G. A. Ilyasova, F. F. Mikhaylis, and others). (9) A program developed by V. P. Kochergin, Ye. I. Zhuravleva, and M. M. Antimonik for calculating the critical mass of a fast reactor by means of Carlson's S_4 method. (10) A program developed by T. A. Germogenova and V. N. Torobtseva under supervision of Ye. S. Kuznetsov for calculating a two-dimensional cylindrical reactor in P_1 approximation (100 zones, 900 points, 9 groups). (11) V. K. Saul'yev's program for calculating a two-dimensional cylindrical reactor in two-group diffusion approximation. (12) N. Ya. Lyashenko's program for calculating a one-dimensional reactor in P_1 approximation (5 zones, 100 points). The following Soviet scientists are

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Review of nuclear reactor...

mentioned in the article: A. D. Galanin (Teoriya yadernykh reactorov na teplovykh neytronakh - Theory of thermal reactors, M., Atomizdat, 1957); N. N. Bogolyubov, (Problemy dinamicheskoy teorii v statisticheskoy fizike. M., Goztekhizdat, 1946); I. I. Gurevich, I. Ya. Pomeranchuk (Lecture at the First Geneva Conference, 1955; Reaktorostroyeniye i teoriya reaktorov - Reactor construction and reactor theory, M., Izd-vo AN SSSR, 1955, p. 220); I. V. Kurchatov (Atomnaya energiya, no. 3, 5, 1956); A. P. Aleksandrov et al. (Lectures at the First and Second Geneva Conferences, 1955 and 1958); D. I. Blokhintsev, N. A. Nikolayev (Lecture, First Geneva Conference, 1955); D. I. Blokhintsev, M. Ye. Minashin, Yu. A, Sergeyev (Atomnaya energiya, no. 1, 24 (1956)); V. I. Firsov (Lecture at a session of the AS USSR on peaceful uses of atomic energy, 1955. M. Izd-vo AN SSSR, 1955); S. M. Feynberg (Lecture, Second Geneva Conference, 1958); A. D. Galanin (Atomnaya energiya, 9, no. 2, 89 (1960)); G. I. Marchuk, V. V. Orlov (Sb. Neytronnaya fizika - Neutron Physics, M., Gosatomizdat, 1961); L. N. Usayev (Lecture, First Geneva Conference, 1955); V. Ya. Pupko (Fizika i teplotekhnika reaktorov - Reactor physics and thermotechnics. Supplement to "Atomnaya energiya", M. Atomizdat, 1958); V. V. Orlov, T. V. Golashvili, A. I. Vaskin (Sb. "Neytronnaya fizika" - Neutron physics, M. Gosatomizdat,

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1961); G. Ye. Blokhin et al. (Atomnaya energiya, 10, no. 5, 437, (1961)); O. D. Kazachkovskiy (Lecture, Second Geneva Conference, 1958); I. I. Bondarenko et al. (Lecture, Second Geneva Conference, 1958); B. D. Kuz'minov, L. S. Kuchayeva, I. I. Bondarenko (Atomnaya energiya, 4, no. 2, 187, 1958); A. I. Novozhilov, S. B. Shikhov (Atomnaya energiya, 8, no. 3, 209 (1960)); V. S. Vladimirov (Tr. Matematicheskogo instituta im. V. A. Steklova AN SSSR, No. 59 (1961)); Yu. A. Romanov (Sb. "Issledovaniya kriticheskikh parametrov, reaktornykh sistem" - Investigations of the critical parameters of reactor systems, M. Atomizdat, 1960); A. N. Tikhonov, A. A. Samarskiy (Dokl. AN SSSR, 108, no. 3 (1956) and 124, no. 4, 779 (1959)); V. S. Vladimirov, I. M. Sobol, (Vychislitel'naya matematika, 3, 130 (1958); I. M. Gel'fand (Lecture Second Geneva Conference 1958); Ye. S. Kuznetsov (Izv. AN SSSR, ser. geofiz. No. 3 and No. 4 (1951)); M. V. Maslennikov (Dokl. AN SSSR, 118, no. 5, 859 (1958); 120, No. 1, 59 (1958)); V. A. Chuyanov (Atomnaya energiya, 7, no. 1, 64 (1959)); Sh. S. Nikolayshvili (Atomnaya energiya, 10, no. 3, 271 (1961)); V. V. Smelov (Atomnaya energiya, 6, no. 5, 546, (1959)); B. B. Kadomtsev (Dokl. AN SSSR, 113, no. 3 (1957)); G. A. Bat' (Lecture, Second Geneva Conference, 1958); Ya. V. Shevelev (Atomnaya energiya, II, no. 3, 224 (1957)); M. I. Laletin

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Review of nuclear reactor...

(Lecture, Second Geneva Conference, 1958); N. I. Buleyev (Matematicheskiy sbornik, 51, No. 2, 227 (1960)). V. A. Kuznetsov, B. F. Gromov, G. I. Toshinskiy, V. V. Chekunov, O. V. Lokutsiyevskiy, A. S. Kronrod, G. M. Adel'son-Vel'skiy, N. N. Chentsov, L. V. Maycrov, M. G. Krutikova, Ye. I. Pogudalina, V. P. Kochergin, G. A. Ilyasova, N. Ya. Lyashchenko, N. A. Dmitriyev, and S. K. Godunov are also mentioned. There are 80 references: 68 Soviet and 12 non-Soviet.

SUBMITTED: June 22, 1961

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"APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R001032220018-2

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A058/A101

AUTHORS: Marchuk, G. I., Orlov, V. V.

TITLE: On the theory of conjugated functions

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 57, abstract 4B427 (V sb. "Neytron. fizika". Moscow, Gosatomizdat, 1961, 30 - 45)

TEXT: The authors analyze an arbitrary linear equation for a $\varphi(x)$ function, where x is the set of all variables characterizing the $\varphi(x)$ state. They offer a general determination of the conjugated function, conjugated equation and value. They formulate a perturbation theory. The general formulae are concretized on the example of radiation (or neutron) transfer theory. The authors give examples of some functionals used in transfer theory, and examples of using perturbation theory.

A. Galanin

[Abstracter's note: Complete translation]

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A058/A101

AUTHORS: Marchuk, G. I., Smelov, V. V.

TITLE: Multigroup method of calculating the spatial-and-energy distribution of thermal-neutron flux, and the application of perturbation theory

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 57, abstract 4B425 (V sb. "Neytron. fizika". Moscow, Gosatomizdat, 1961, 143 - 160)

TEXT: The spatial-and-energy distribution of thermal neutrons is determined in a P_1 approximation with the aid of multigroup methods. The proposed method is not connected with a particular mechanism of neutron interaction with matter and allows of taking into account the thermal motion of moderator nuclei, as well as crystalline and molecular bonds. The authors give the initial formulae and the finite-difference diagram. Group constants are derived with the aid of conjugated equations. The difference system of the multigroup equations is solved by the matrix-factorization method. The authors give a method for deriving the formulae of perturbation theory. To illustrate the method, the

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Multigroup method of...

authors calculated numerical examples: the spatial-and-energy spectrum of neutrons in a cylindrical uranium-graphite cell was determined for three different block radii in a three-group approximation. The thermal utilization factor for the case of one group and three groups differ but little in the calculated examples, owing to low absorption in the moderator.

O. Moskalev

[Abstracter's note: Complete translation]

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24.6500 (3416) (4616)
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A058/A101

AUTHORS: Marchuk, G. I., Smelov, V. V.

TITLE: On the calculation of the thermal utilization factor taking neutron thermalization into account

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 59, abstract 4B444 (V sb. "Neytron. fizika", Moscow, Gosatomizdat, 1961, 161 - 168)

TEXT: The present work deals in the main with taking nondiffusion into account in determination of the spatial-and-energy distribution of thermal neutrons, which is important at high absorption. Two approaches to the solution of this problem are examined: utilization of higher approximations in the method of spherical harmonics, and setting effective boundary conditions to the surface of the block, conditions that make diffusion theory more precise. By way of illustration of the first approach, the authors write down calculation formulae in a P_1-approximation on the example of a one-dimensional lattice; for the second approach, they use the earlier known improvement of boundary conditions for the single-velocity problem. They give the results of numerical calculation of the thermal utilization factor of a plane uranium-water lattice for three variants

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On the calculation of...

differing in water-layer thickness. Examples are calculated in a two-group energy approximation and in P_1 and P_3 angular approximations. The scattering function is calculated on the gas model, using two of its moments. For purposes of comparison, the problem was also calculated in a one-group approximation.

O. Moskalev

[Abstracter's note: Complete translation]

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24 6.500

AUTHORS: Yermakov, S. M., Kolesov, V. Ye., Marchuk, G. I.

TITLE: A numerical method of solving Schroedinger's equation with a potential

PERIODICAL: Referativnyy zhurnal, Fizika, no. 5, 1962, 17-18, abstract 5A189 (V sb. "Neytron fizika", Moscow, Gosatomizdat, 1961, 314-323)

TEXT: A description is given of a numerical method permitting to find both single-particle nuclear energy levels and reaction cross-sections. To determine the levels, it is necessary to solve Schroedinger's equation

$$d^2u(r)/dr^2 + B(r)\,u(r) = x^2 u(r),$$

where B (r) is the effective potential including the conventional potential V (r) which may have singularities at zero, the spin-orbit term and the centrifugal energy; $\chi^2 = \frac{2m}{\hbar^2} E$. The equation is complemented by the boundary condition $du/dr|_{r=H} = -\chi u(H)$, where H is selected in a way to obtain $|B(r)| < \varepsilon$ (ε is the small number) in case r = H. This equation, together with the boundary condition, is substituted with the help of a three-particle difference scheme with the step h = H/n (n is an integer) by some system of linear algebraic

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equations regarding the values u_i of function u (r) at the points of multiple n. Parameter x is found from the condition of the determinant of this system D being equal to zero. Similarly is solved Schroedinger's equation if $E > 0$ (generally speaking, the potential V (r) is complex in this case). The unknown parameter is here the logarithmic derivative of function u in case r = H. This parameter can also be found from some determinant (its evaluation scheme is presented). For particular machine-type calculations, the following Wood-Saxon potential was used

$$V(r) = -V_0 (1 + i\xi)[1 + \exp(r - R)/a]^{-1}$$

when V_0 = 43 and 45 Mev, R = 5.55 and 7.72 fermi, a = 0.35 and 0.60 fermi, ξ = [illegible] and 0.075 (this corresponds to the nuclei of Ni and U). The differential and total cross-sections of the elastic scattering of 0.1 - 15 Mev neutrons, the capture cross-section and the total cross-section were found. Positions of single-particle neutron energy levels were also obtained at ξ = 0 and at the same values of other parameters.

V. Batygin

[Abstracter's note: Complete translation]

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21/1000

AUTHORS: Marchuk, G. I., Kocherygin, V. P., Pogudalina, Ye. I., Kuznetsova, L. I.

TITLE: Application of an effective one-group method to calculating of nuclear reactors

PERIODICAL: Teoriya i metody rascheta yadernykh reaktorov; sbornik statey. Ed. by G. I. Marchuk. Moscow, Gosatomizdat, 1962, 79 - 85

TEXT: Several problems on applying one-group methods to criticality calculations are discussed. Though one-group approximation is less accurate than multi-group methods, it can be used for improving the critical parameters. Since e.g. the formulas for averaging the constants are fractional-linear functionals it is possible to average the constants without needing to use the true solutions of the reactor equations. This can be done by any approximate solution to these equations, e.g. the diffusion or P_1-approximation. The constants then used for calculating the critical parameters yield a better approximation than P_1. Several variants of

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applying one-group reactor equations are analyzed. If the system of reactor equations

$$\left.\begin{aligned} \nabla\varphi_1 + \Sigma\varphi_0 &= \int_{u-r}^{u} \Sigma_s f(u-u')\varphi_0(r,u')du' \\ &+ \int_{-\infty}^{u} \Sigma_{in}(u')\alpha(u,u')\varphi_0(r,u')du' + X(u)\alpha(r); \\ \frac{1}{3}\nabla\varphi_0 + \Sigma\varphi_1 &= \int_{u-r}^{u} \Sigma_s f(u-u')\varphi_1(r,u')du' \end{aligned}\right\} \quad (1)$$

is represented as multi-group equations in P_1 approximation, the effective one-group constants are

$$\overline{\Sigma}_c = \frac{\int_{Gn} dr\varphi_0^*\overline{\Sigma_c\varphi_0}}{\int_{Gn} dr\varphi_0^*\overline{\varphi}_0}; \quad \overline{\nu\Sigma}_f = \frac{\int_{Gn} dr\varphi_0^*\alpha(r)}{\int_{Gn} dr\varphi_0^*\overline{\varphi}_0}; \quad \overline{\Sigma}_{tr} = \frac{\int_{Gn} dr\nabla\varphi_0^*\overline{\varphi}_0}{3\int_{Gn} dr\nabla\varphi_0^*\overline{\varphi}_1} \quad (10)$$

where

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$$\chi(r) = \int_{-\infty}^{\infty} \nu\Sigma f \varphi_0(r,u)du, \quad \overline{\Sigma_c \varphi_0} = \sum_{j=1}^{m} [\Sigma_c^j \varphi_0^j + (1 - p^i) q^j], \quad \overline{\varphi}_0 = \sum_{j=1}^{m} \varphi_0^j, \quad \overline{\varphi}_1 = \sum_{j=1}^{m} \varphi_1^j$$

p^i is the resonance capture probability, q^i the moderator density, $\chi(u)$ is the fission spectrum, Σ the total macroscopic cross section, Σ_s and Σ_{in} elastic and inelastic scattering cross sections, r the maximum logarithmic energy loss, f_0, f_1 and w are collision functions; $\overline{\Sigma}_c$, $\overline{\Sigma}_{tr}$ and $\overline{\nu\Sigma}_f$ are cross sections chosen such that the k_{eff} calculated from (1) and from the conjugate equations

$$-\nabla\varphi_1^* + \overline{\Sigma}_c\varphi_0^* = \overline{\nu\Sigma}_f\varphi_0^*; \qquad -\frac{1}{3}\nabla\varphi_0^* + \overline{\Sigma}_{tr}\varphi_1^* = 0 \qquad (4),$$

coincide. In first approximation one can replace φ_0^* and $\vec{\varphi}_1^*$ in (10) by $\vec{\varphi}_0$ and $\vec{\varphi}_1$. With the one-group constants thus obtained the system (4) is solved, after which the constants are averaged again making use of (10). This process is repeated successively until k_{eff} from (4) becomes constant.

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The one-group constants can be used for improving the critical mass parameters by solving the one-group kinetic equation

$$\Delta\nabla\varphi + \bar{\Sigma}_{tr}\varphi = \frac{\bar{\Sigma}_{tr} - \bar{\Sigma}_c + \nu\bar{\Sigma}_f}{4\pi} \int \varphi d\Omega \qquad (11)$$

with the method of spherical harmonics. This is done for a spherical reactor with infinite water reflector. The critical mass of aqueous solutions of 90% enriched UO_2F_2 is calculated in P_3-approximation using the above described one-group method and a multi-group method. The deviation is ~5%. Similar calculations are carried out for uranium graphite systems. There are 3 figures.

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21.2100

AUTHORS: Marchuk, G. I., Il'in, V. P.

TITLE: Neutron resonance capture in an annular lump

SOURCE: Teoriya i metody rascheta yadernykh reaktorov; sbornik statey. Ed. by G. I. Marchuk. Moscow, Gosatomizdat, 1962, 191 - 199

TEXT: A method for calculating the effective resonance integral of thin lumps had been developed by Gurevich and Pomeranchuk, and one for thick lumps by Wigner. Working independently, Orlov (Atomnaya energiya 4,6,1958) and Rudik generalized these methods to apply to blocks of any thickness. Proceeding from the results of this generalization, the authors deal with problems concerning the resonance of an annular lump when the mutual shielding of the lumps is taken into account. The lump under consideration is assumed to be embedded in moderator, but absorption and retardation are disregarded. The epiresonance neutron flux is taken to be isotopic and equal to $\varphi_0/4\pi$, the moderator density constant and equal to 1. The total number of resonance absorptions is considered to be the sum of those inside the ring (region I), those within the ring itself (III) and those outside

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the ring (II): $p_j = p_j^{I} + p_j^{II} + p_j^{III}$. Substituting

$$p_j^{I} = \frac{\varphi_0}{4\pi}\left\{\iint_{G_1} ds\, d\Omega' |\Omega_n| l \int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_{sn}}{\Sigma} dE + \iint_{G_1} ds\, d\Omega' |\Omega_n| \int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_r}{\Sigma^2}(1-e^{-\Sigma l}) dE\right\}, \quad (3)$$

$$p_j^{(II)} = \frac{\varphi_0}{4\pi}\left\{\iint_{G_2} ds\, d\Omega' l \int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_{sn}}{\Sigma}\left(1 - \frac{1-e^{-\Sigma l}}{\Sigma_{sn} l}\right) e^{-\Sigma_s^{I} L} dE + \right.$$

$$\left. + \iint_{G_2} ds\, d\Omega' |\Omega_n| \int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_r}{\Sigma^2}(1 - e^{-\Sigma l}) dE\right\}. \quad (4)$$

and

$$p_j^{III} = \frac{\varphi_0}{4\pi} \iint_{G_3} ds\, d\Omega' |\Omega_n| \int_{E_j-\alpha}^{E_j+\alpha} \left[\frac{\Sigma_c \Sigma_{sn}}{\Sigma^2} + \frac{\Sigma_c \Sigma_r}{\Sigma^2} e^{-\Sigma l}\right](1-e^{-\Sigma l}) e^{-\Sigma_s^{I} L} dE, \quad (7)$$

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a series of transformations and simplifications leads to

$$p_j = \frac{1}{(\xi \Sigma_s)^{e\Pi}} \left\{ \alpha_1 V + \alpha_2 V + \gamma_3 S \frac{\Sigma_{sn}}{\Sigma_{sn}} e^{-S\bar{L}} \cdot \int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_{sn}}{\Sigma} dE + \right.$$

$$+ \frac{S}{4} \left\{ \gamma_1 \Phi_1(\Sigma_{sn}\bar{l}_1) R_1(\tfrac{1}{2}\Sigma_s \Pi \bar{L}_o, \tfrac{1}{2}\Sigma_{sn}\bar{l}_1) + \gamma_2 \Phi_1(\Sigma_{sn}\bar{l}_2) + \right.$$

$$+ \gamma_3 \left[\Phi_1(2\Sigma_{sn}\bar{l}_3) R_2(\tfrac{1}{2}\Sigma_s \Pi \bar{L}_o, \tfrac{1}{2}\Sigma_{sn}\bar{l}_3) - \right.$$

$$\left. \left. - \Phi_1(\Sigma_{sn}\bar{l}_3) R_1(\tfrac{1}{2}\Sigma_s \Pi \bar{L}_o, \tfrac{1}{2}\Sigma_{sn}\bar{l}_3) e^{-S\bar{L}} \int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_r}{\Sigma^2} dE \right] \right\}, \quad (37)$$

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$$R_k(\Sigma_s^{II} L_o, \Sigma_{sn} \bar{l}) = \frac{\int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_r}{L^2} \frac{1 - e^{-\Sigma_s^{II} L_o}}{1 - e^{-\Sigma_s^{II} L_o}} (1 - e^{-k\Sigma \bar{l}})\, dE}{\int_{E_j-\alpha}^{E_j+\alpha} \frac{\Sigma_c \Sigma_r}{L^2} (1 - e^{-k\Sigma \bar{l}})\, dE}.$$

The total effective resonance integral works out at $J^{eff} = \alpha a + \gamma(S/M)b$, where S is the surface area of a cell and M the mass of uranium per cell. There are 4 figures.

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(Neutrons—Spectra)

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