

BABURKIN, I.N.; KOGAY, N.A.

Problems of the geographical regionalization of Central Asia and
Uzbekistan. Nauch.trudy TashGU no.231 Geog. nauki no.27:5-247

1972.

(MIRA 18:3)

BABUSHKIN, L.N.

Babushkin, L.N. "On the frequency of dry winds in the various areas of Central Asia. (On the question of estimating the growing period of the cotton plant). Izvestiya Akad. nauk UzSSR, 1948, No. 3, p. 114-21, (Resume in Uzbek), - Bibliog: 9 items.

SO: U-3042, 11 March 53, (Letopis 'nykh Statey, No. 9, 1949)

BABUSHKIN, L. N.

Babushkin, L. N. "On the evaluation of the 'subtropical' character of the climate of the Central Asian republics," Trudy Tashk. geofiz. observatorii, Issue 1, 1949, p. 35-36.

So: U-3736, 21 May 53, (Letopis 'Zhurnal 'nykh Statey, No. 17, 1949).

BABUSHKIN, L. N.

Babushkin, L. N. "Temperature and precipitation in the winter season in the lowland part of Uzbekistan," Trudy Tashk. geofiz. observatorii, Issue 1, 1949, p. 40-78, - Bibliog: 17 items.

So: U-3736, 21 May 53, (Letopis 'Zhurnal 'nykh Statey, No. 17, 1949).

EAFUSHKIN, D. N.

Uzbekistan - Meteorology, Agricultural

Method of agrometeorological data and forecasts in Uzbekistan. Trudy tashk. gecfiz. obser. No. 3, 1949.

Monthly List of Russian Accessions, Library of Congress
June 1953. UNCL.

BABUSHKIN, L.N. (Editor)

"Aerometeorology," Trudy Tashkentskoy Geofizicheskoy Observatorii (Works of the Tashkent Geophysical Observatory), No 3(4), 1949, Leningrad (Editor: L.N. Babushkin).

BABUSHKIN, L.M.

**Division of Uzbekistan into agricultural climatic districts. Trudy
SAGU no.28:57-82 '51. (MLRA 9:5)**

(Uzbekistan--Crops and climate)

BABUSHKIN, L.N.

Air temperature and humidity in cotton and alfalfa fields under irrigation farming conditions in Uzbekistan. Trudy Tashk. geofiz. observ. no.7:25-62 '52. (MIRA 11:3)
(Uzbekistan--Meteorology, Agricultural)
(Irrigation farming)

BABUSHKIN, L.N.

Agrometeorological evaluation of the growing season of cotton in
Uzbekistan. Trudy Tashk. geofiz. observ. no.7:99-132 52.
(Uzbekistan--Cotton growing) (MIRA 11:3)
(Meteorology, Agricultural)

BABUSHKIN, L. N.

Klimat Uzbekistana The climate of Uzbekistan Tashkent, Izd-vo Akademii
Nauk USSR, 1953.

36 p.

So: 42N/5

623.44

.B1

BABUSHKIN, L N

42N/5
632.831
.B1

Vliyaniye pogody na razvitiye khlopchatnika ubekistane (The influence of climate of the growth of cotton in Ubekeistan, by) L. N. Babushkin i M. B. Blyum. Tashkent, Akademiya naul UzSSR, 1953.

27 p. diags., tables.

BABUSHKIN, L. N.

"Agrometeorological Evaluation of Seasons".
Trudy Tashkentsk. Geofiz. Observ., No 8, pp 3-27, 1954.

Evaluation of the seasons of the year in Uzbekistan is made by the author proceeding from knowledge of the individual meteorological elements for agriculture production and for the life of plants. Thus evaluation of winter is carried out on the level of temperature to determine the possibility of injury or further development of crops. Essential significance for agricultural plants is possessed by snow cover and precipitation; therefore the author groups winters into cold, temperats, warm and into snowy, moderately snowy, slightly snowy, and also into rainy, moderately rainy, dry. Spring is grouped into corresponding schemes. (RZhGeol, No 11, 1955)

SO: Sum No 884, 9 Apr 1956

BABUSHKIN, I. K.

"Agrometeorological Observations in Rice Fields"
Trudy Tashkentsk. geofiz. observ., No 8, 1954, 37-46

Observations on temperature and humidity of the air in two rice fields and in an unirrigated control field near Tashkent. In the course of the vegetative period four around-the-clock series of observations were conducted with the Assman psychrometer at heights of 2 meters and 2 cm and at a level 3/4 of the height of the rice stem. The air temperature at height 2 m over rice fields in the summer (during thick stems and soil flooded with water) was 1-1.5° lower in the daytime, in the autumn (during drying of the water) in the daytime and night-time, than over the control field; in the summer at night the temperatures were leveled off. (RZhGeol, no 9, 1955)

SO: Sum-No 845, 7 Mar 56

BABUSHKIN, L.N.

Agricultural climatic characteristics of the Pamirs. Trudy SAGU
no.50:49-59 '54. (MIRA 9:7)
(Pamir--Crops and climate)

RABUSHKIN, L.N.

Studies on the agricultural meteorology of Uzbekistan and
their practical application. Trudy SAGU no.60:117-170 '54.
(Uzbekistan--Meteorology, Agricultural) (MLRA 9:11)

KORZHENEVSKIY, N.K.; BABUSHKIN, L.N., professor, redaktor.

[Glaciers on the northern slopes of the Alai Range] Ledniki severnogo sklona Alaiskogo khrebta. Tashkent, Izd-vo SAGU, 1955. 61 p. (Tashkent. Universitet. Trudy Sredneaziatskogo gosudarstvennogo universiteta, no.64). (MLRA 9:5)
(Alai Range--Glaciers)

BABUSHKIN, L. N.

AID P - 1883

Subject : USSR/Meteorology and Hydrology
Card 1/1 Pub. 71-a - 26/26
Author : Babushkin, L. N.
Title : ~~Professor A. A. Skvortsov~~ Professor A. A. Skvortsov (Obituary)
Periodical : Met. i gidro., no.2, 65-66, 1955
Abstract : The article describes the life and scientific activities of one of the leading meteorologists of the USSR who died in 1954.
Institution : None
Submitted : No date

BABUSHKIN, L.N.

Characteristics of the Kashka-Dar'ya Province climate. Trudy SAGU
no.80:27-47 '56. (MLRA 10:4)
(Kashka-Dar'ya Province--Climate)

BABUSHKIN, L.^{N.} KHUSANOVA, Kh.

Characteristics of climatic fluctuations in Uzbekistan. Izv. Uzb.
fil. Geog. ob-va 2:3-10 '56. (MIRA 11:4)
(Uzbekistan--Climate)

Babushkina L.N.
AYZENSHTAT, Boris Abramovich; BALASHEVA, Yelena Nikolayevna; ZHITOMIRSKAYA,
Ol'ga Maoiseyevna; ~~BABUSHKIN~~ *L.N.*, prof., red.; ZHDANOVA, L.P.,
red.; FLAUM, M.Ya., tekhn.red.

[Climatological description of the Golodnaya Steppe] Klimaticheskoe
opisanie Golodnoi stepi. Pod red. L.N.Babushkiba. Leningrad,
Gidrometeor. izd-vo, 1958. 73 p. (MIRA 11:7)
(Golodnaya Steppe--Climate)

SHUL'TS, V.L.; BABUSHKIN, L.N., prof., otv. red.

[Hydrography of Central Asia; a brief survey] Gidrografiia
Srednei Azii kratkii ocherk. Tashkent. Izd-vo SAGU. 1958.
114 p. (Tashkent. Universitet. Trudy Srendeaziatskogo gosudar-
stvennogo universiteta, no.129) (MIRA 12:2)
(Soviet Central Asia--Hydrography)

KORZHENEVSKIY, N.L. [deceased], red.; BABUSHKIN, L.N., doktor geogr.
nauk, otv.red.; DONSKOY, P.V., red.; YAKOVENKO, Ye.P., red.;
GOR'KOVAYA, Z.P., tekhn.red.

[Natural conditions and resources of the Amu-Darya lower
reaches; the Kara Kalpak A.S.R. and Khorezm Province of the
Uzbek S.S.R.] Prirodnye uslovia i resursy nizov'ev Amu-Dar'i
(Kara Kalpakskaya ASSR i Khorezmskaya oblast' UzSSR).
Tashkent, Izd-Vo Akad nauk Uz.SSR, 1959. 350 p. (Materialy
po proizvoditel'nym silam Uzbekistana no.10).

(MIRA 13:2)

(Amu-Darya Valley--Physical geography)

AKULOV, V.V., kand.geogr.nauk; BABUSHKIN, L.N., doktor geogr.nauk;
ORESHINA, L.M.; SKVORTSOV, Yu.A., doktor geol.-mineral.nauk;
PETROV, N.P., kand.geol.-mineral.nauk; CHERNEVSKIY, N.N.;
KRYLOV, M.M., doktor geol.-mineral.nauk; KHASANOV, A.S.;
BEDER, B.A., kand.geol.-mineral.nauk; KIMBERG, N.V., kand.
sel'skokhoz.nauk; SUCHKOV, S.P.; GLAGOLEVA, A.F.; PERVU-
SHINA-GROSHOVA, A.N.; VERNIK, R.S., kand.biol.nauk; MOMOTOV,
I.F.; GRANITOV, I.I., kand.biol.nauk; SALIKHBAYEV, Kh.S., kand.
biolog.nauk; STEPANOVA, N.A., kand.biolog.nauk; YAKHONTOV, V.V.;
DAVLETSHINA, A.G., kand.biolog.nauk; MURATBEKOV, Ya.M., kand.
biolog.nauk [deceased]; KUKLINA, T.Ye.; KORZHENEVSKIY, N.L., red.
[deceased]; GORBUNOV, B.V., kand.geologo-mineral.nauk, red.;
DONSKOY, P.V., red.; YAKOVENKO, Ye.P., red.izd-va; GOR'KOVAYA,
Z.P., tekhn.red.

[Materials on the productive forces of Uzbekistan] Materialy po
proizvoditel'nykh silam Uzbekistana. Tashkent. No.10. [Natural
conditions and resources of the lower reaches of Amu-Darya;
Kara-Kalpak A.S.S.R. and Khorezm Province of the Uzbek S.S.R.]
Prirodnye usloviia i resursy nizov'ev Amu-Dar'i; Kara-Kalpakskaya
ASSR i Khorezmskaya oblast' UzSSR. 1959. 351 p. (MIRA 13:5)

1. Akademiya nauk Uzbekskoy SSR, Tashkent. Sovet po izucheniyu
proizvoditel'nykh sil. 2. Chleny-korrespondenty AN UzSSR (for
Yakhontov, Korzhenevskiy).

(Amu-Darya Valley--Physical geography)

BABUSHKIN, L.N.

Climatic characteristics. Trudy TashGU no.185:31-47 '61.
(MIRA 14:12)

(Surkhan-Darya Province--Climate)

BABUSHKIN, L.H.; KOGAY, N.A.

Physicogeographical zones. Trudy TashGU no.185:199-214 '61.
(MIRA 14:12)
(Surkhan-Darya Province--Physical geography)

BABUSHKIN, L.N.

Temperature regime during cold weather periods in the republics
of Central Asia. Izv.Uzb.fil.Geog.ob-va 6:11-29 '62.

(MIRA 15:8)

(Soviet Central Asia--Atmospheric temperature)

BABUSHKIN, L.N., doktor geogr. nauk, prof., glav. red.; AKRAMOV, Z.M., doktor geogr. nauk, red.; SULTANOV, G.S., kand. biol. nauk, red.; PETROSYANTS, M.A., kand. fiz.-matem. nauk, red.; ZARIFOV, Kh.T., kand. filolog. nauk, red.; TOLSTOV, N.N., red.; BAUDINA, S.B., red.; VOLKOVA-VOLK, V.M., red.

[Atlas of the Uzbek Soviet Socialist Republic] Atlas
Uzbekskoi Sovetskoi Sotsialisticheskoi Respubliki.
Tashkent, 1963. 53 p. (MIRA 18:2)

1. Russia (1923- U.S.S.R.) Glavnoye upravleniye geodezii i kartografii. 2. Tashkentskiy Gosudarstvennyy universitet (for Babushkin).

L 23975-65 EWT(1)/FCC GW

ACCESSION NR: AR5002526

S/0169/64/000/010/B055/B055

SOURCE: Ref. zh. Geofizika, Abs. 10B338

AUTHOR: Babushkin, I. N.

TITLE: Agroclimatic description of Central Asia

CITED SOURCE: Nauchn. tr. Tashkentsk. un-t, vyp. 236, 1964, 5-185

TOPIC TAGS: agroclimatology, climate, agrometeorology, regional climatology, air temperature

TRANSLATION: On the basis of data from climatic investigations, agrometeorological data and corresponding systematic agroclimatic analyses, the author has made an evaluation of the degree of favorability of the climatic conditions of the republics of Central Asia for agricultural production. At the beginning of the study there is a discussion of general problems involved in agrometeorology and agroclimatology. The author discusses the basis for and cites agroclimatic indices used in the agroclimatic description of Central Asia. In evaluating the temperature resources, preference has been given to the sums of effective and positive temperatures above 0, +5 and +10C applying respectively to ephemeral

pasture vegetation, grains, cotton fields and other thermophilic crops. The

1/2

L 23375-65

ACCESSION NR: AR5002526

author notes the effectiveness of the use of the Long precipitation factor for evaluation of moisture conditions in the climate of Central Asia. A considerable part of the study is devoted to information on the climate of Central Asia. Bibliography of 89 items. Yu, Mel'nik.

SUB CODE: ES

ENCL: 00

Card 2/2

L 23377-65 ENT(1)/FCC GW
ACCESSION NR: AR5002527

S/0169/64/000/010/B055/B055

SOURCE: Ref. zh. Geofizika, Abs. 10B339

AUTHOR: Babushkin, L. N.

TITLE: Agroclimatic regionalization of Central Asia

CITED SOURCE: Nauchn. tr. Tashkentsk. un-t, vyp. 236, 1964, 186-272

TOPIC TAGS: climatology, agrometeorology, agroclimatology, regional climatology

TRANSLATION: Agroclimatic regionalization was accomplished by dividing the area into agroclimatic provinces, regions and districts. The independent climatic provinces were based on the following geographic complexes defined by V. M. Chetyrkin in the complex geographic regionalization of Central Asia: 1) Tura Valley, 2) Central Kazakhstan, 3) Ozungaria-T'ien-shan and 4) Kashgar. Subprovinces have been defined in climatic provinces for which the presence of lowland and mountainous relief is typical. The boundaries of regions in subprovinces of foothills and mountains have been drawn on the basis of orographic limits; the laws of development of latitudinal zonality and the character of the underlying surface were taken into account in lowland areas. The delimiting of groups of districts was on the basis of a comparative analysis of climatic conditions within each

L 23377-65

ACCESSION NR: AR5002527

region, analysis of the forms of manifestation of vertical and latitudinal zonality and a number of other factors. In this process it is important to define groups of districts in agroclimatic respects by including the agroclimatic indices in the analysis. With this approach, the regionalization acquires a special agroclimatic direction. The author describes groups of districts and the principal agroclimatic indices for a number of crops. It is emphasized that in agroclimatic regionalization there can be no uniform approach to the description of climate in the interests of irrigation and for the purposes of the agricultural use of nonirrigated areas. Bibliography of 23 items. Yu. Mel'nik

SUB CODE: ES

ENCL: 00

Card 2/2

BABUSHKIN, L.N.

Physiological significance of the process of water vapor absorption by plant leaves. Dokl. AN SSSR 155 no. 5:1216-1219 Ap '64.
(MIRA 17:5)

1. Moldavskiy nauchno-issledovatel'skiy institut orshayemogo zemledeleya i ovoshchevodstva. Predstavleno akademikom A.L. Kursanovym.

ODING, I.A.; BABUSHKIN, L.O. [deceased]

Effect of small intermediate plastic deformation on the process of
creeping. Trudy TSNIITMASH 45:39-64 '52. (MIRA 9:2)

1.Chlen-korrespondent AN SSSR (for Oding)
(Creep of metals) (Steel--Testing)

BABUSHKIN

10(17) (17) IV. PART I BOOK EXPLOITATION 304,3305
Akademiya nauk Azerbaydzhanskoj SSR

Tesley dokladydov Sovershebniya po vychislitel'noj matematike i primeneniya sredstv vychislitel'noj tekhniki (Outlines of Reports of the Conference On Computational Mathematics and the Use of Computer Techniques) Baku, 1958. 63 p. 400 copies printed.

Additional Sponsoring Agencies: Akademiya nauk SSSR. Vychislitel'nyy tsentr, and Akademiya nauk SSSR. Institut avtomatiki i telemekhaniki.

No contributors mentioned.

PURPOSE: This book is intended for pure and applied mathematicians, scientists, engineers and scientific workers, whose work involves computation and the use of digital and analog electronic computers.

COVERAGE: This book contains summaries of reports made at the Conference on Computational Mathematics and the Application of Computer Techniques. The book is divided into two main parts. The first part is devoted to computational mathematics and contains 19 summaries of reports. The second section is devoted to computing techniques and contains 20 summaries of reports. No personalities are mentioned. No references are given.

Babich, Yu.A. On the Filtration of a Liquid in Nonhomogeneous Media	36
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Nikolayev, S. New Continuously Operating Mathematical Machines for the Solution of Mathematical Physics Problems	40
Ragimova, Kh. Application of Mathematical Machines for the Solution of a Number of Scientific and Engineering Problems of Petroleum Production (Summary Reports)	41
Belkin, V.D. Application of Electronic Digital Computers in National Economic Planning	43
Babushkin, M.E. Operational Experience of the MPT-9 and IPT-5 Analog DEVICES AND CERTAIN Possibilities for Increasing the Number of Problems They Are Able to Solve	52
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Card 6/7

Handwritten scribbles

AUTHORS: 1)Gorodskiy, D. A., Professor, Doctor SOV/105-58-9-19/34
of Technical Sciences, Volchkov, I. Ye., Engineer
2)Ivanov-Smolenskiy, A. V., Docent, Candidate of Technical
Sciences
3)Veretennikov, L. P., Docent, Candidate of Technical
Sciences, Barinov, N. G., Docent, Candidate of Technical
Sciences, Babushkin, M. N., Candidate of Technical Sciences (Leningrad)
Potapkin, A. I., Engineer
(Leningrad)

TITLE: Dynamic Models of Power Systems (p dinamicheskikh modelyakh energosistem)

PERIODICAL: Elektrichestvo, 1958, Nr 9, pp 80 - 82 (USSR)

ABSTRACT: Remarks concerning the paper by I.S.Bruk in Elektrichestvo, 1958, Nr 2. 1) According to the paper, the methods of using mathematical and physical models are contrary to each other. It is shown here that this is not correct and that a reasonable coordination of the two methods should rather be aimed at. 2) The author follows the opinion of M.P.Kostenko, V.A.Venikov and N.N.Shchedrin, and points out that for investigating transients in

Card 1/2

Dynamic Models of Power Systems

SOV/105-58-9-19/34

electric power systems one should combine the results gained with dynamic models with those obtained by the use of electronic digital computers. 3) The authors ask for a combined use of dynamic models and computers. They show that even in such fields where digital computers prevail, one cannot do without dynamic models. There are 3 Soviet references.

ASSOCIATION: 1) Nauchno-issledovatel'skiy institut elektrotekhnicheskoy promyshlennosti (Scientific Research Institute of Electrical Industry) 2) Moskovskiy energeticheskiy institut (Moscow Institute for Power Engineering)

** applies for authors 1) and 2)*

Card 2/2

S/194/61/000/012/027/097
D201/D303

9,7200

AUTHOR:

Babushkin, M. N.

TITLE:

The results of utilizing electronic analogues MPT-9 (MPT-9), IPT-5 (IPT-5) and some possibilities of extending the range of their problem-solving capabilities

PERIODICAL:

Referativnyy zhurnal, Avtomatika i radioelektronika, no. 12, 1961, 16, abstract 12B89. (Tr. Vses. soveshchaniya po vychisl. matem. i primeneniyu sredstv vychisl. tekhn., Baku AN Azerb SSR, 1961, 240-251)

TEXT: The continuous utilization of over more than 3 years of electronic MPT-9 and IPT-5 analogues has made it possible to determine certain of their properties. These are as follows: 1) The use of capacitances up to 1 μF only, for integrating circuits; 2) the absence of differentiators; 3) high values of potentiometers in constant and variable coefficient circuits; 4) a relatively high output impedance of operational amplifiers; 5) a higher than 1 Megohm input resistor; 6) step-approximation of variable coefficient

Card 1/3

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D201/D303

The results of utilizing ...

cients; 7) short setting time of variable coefficient circuits; 8) small range of frequencies for controlling the operation of variable coefficient circuits. The use in integrators of capacitors up to $1 \mu\text{F}$ only results in the greatest accuracy of the analogue equation solutions being obtained when the operating speeds are of the order of seconds. This necessitates, in practice, solution of equations not to their natural scale. The description of procedure in choosing the time and variable scales is given. In the opinion of the author, the specific properties of the two machines show best in the method based on equalization of coefficients of equations being solved. The transformation of initial into the machine equations is given when the derivatives are on the RHS. It is shown that in setting coefficients > 1 , the fact that the coefficient unit may have a potentiometer of the value of about 30 kilo-ohms should be borne in mind and that this value could produce an error $\sim 0.5\%$. The use of several inputs of the operational amplifier for setting the coefficient value makes it possible to increase the accuracy. Methods of setting-up equations with the help of variable coefficient units, of obtaining aperiodic circuits

Card 2/3

The results of utilizing ...

S/194/61/000/012/027/097
D201/D303

with small time-constants and of obtaining relay-type non-linear characteristics are given. [Abstractor's note: Complete translation.]

B

Card 3/3

BABUSHKIN, M.N.

BR

PHASE I BOOK EXPLOITATION

SOV/5962

Vsesoyuznoye soveshchaniye po vychislitel'noy matematike i primeniyu sredstv vychislitel'noy tekhniki, Baku, 1958.

Trudy (Transactions of the All-Union Conference on Computer Mathematics and Applications of Computers) Baku, Izd-vo AN Azerbaydzhanskoy SSR, 1961. 254 p. 500 copies printed.

Sponsoring Agency: Akademiya nauk Azerbaydzhanskoy SSR. Vychislitel'nyy tsentr.

Eds.: A.A. Dorodnitsyn, S.A. Aleskerov, and K.F. Shirinov; Ed. of Publishing House: A. Til'man; Tech. Ed.: T. Ismailov.

PURPOSE: The book is intended for mathematicians and other specialists interested in computer theory and uses for computers.

COVERAGE: The book contains the texts of 24 papers presented at the All-Union Conference on Computer Mathematics and Applications of Computers held in Baku, 3-8 Feb 1958. The "Resolution"

Card 1/3

25

Transactions of the All-Union (Cont.)

SOV/5962

of the conference, consisting of proposals for accelerating the development of computer mathematics and computer engineering, is also included.

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Transactions of the All-Union (Cont.) SOV/5962

Val'denberg, Yu.S. Machine Solution of a Class of Integral Equations by Zeydel's Iterative Method 216

Zhukauskas, K.P. Calculation of the Parameters of a Symmetrical Trigger on the Basis of Level-Drop Using Zero and First Approximations 228

~~Babushkin, M.N.~~ Experience from Operations With the MPT-9 and IMT-5 Electronic Analog Computers and Possibilities for Enlarging the Scope of Their Application 240

Resolution 252

AVAILABLE: Library of Congress (Q476.V8 1958)

SUBJECT: Mathematics
Computers and Computer Engineering

Card 6/6

IS/dmp/bmc
6-6-62

БАБУШКИН, М. С.

BARUSHKIN, M. S.

Moia pervaiia posadka na led. (In: Vozdushnye puti severa. Moskva, 1933,
p.420-424, illus.)

Title tr.: My first landing on ice.

TL532.V6

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of
Congress, 1955.

BABUSHKINA, N.A.

Anomalous galvanomagnetic properties of gadolinium. Dokl. AN SSSR
155 no.6:1290-1292 Ap '64. (MIRA 17:4)

1. Predstavleno akademikom I.K.Kikoinym.

137-58-6-11354

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 14 (USSR)

AUTHORS: Babushkin, N.M., Miller, V.Ya., Durnov, V.K.

TITLE: Clinkering Fine Concentrates by Pelletizing and Subsequent Roasting (Okuskovaniye tonkoizmel'chennykh kontsentratov metodom okomkovaniya s posleduyushchim obzhigom)

PERIODICAL: Byul. nauchno-tekhn. inform. Ural'skiy n.-i. in-t chernykh metallov, 1957, Nr 3, pp 14-25

ABSTRACT: A fine-ground magnetite concentrate from the KMA ore dressing and concentrating plant is used to study the process of clinkering and roasting pellets (P). The chemical composition, in %, is as follows: Fe 56.16, FeO 23.92, Fe₂O₃ 56.70, SiO₂ 16.85, Al₂O₃ 0.48, CaO 0.55, MgO 0.88, and S 0.037. The design of an experimental plant for roasting P is presented as is that of an experimental pilot plant for clinkering Fe ores and concentrates. It is shown that the roasting of fluxed P on belt-type machines is entirely possible. Production of solid fluxed P differs from that of unfluxed P in the need for generating a certain amount of liquid phase which affords a complete utilization of the lime and solidification of the P on roasting. The narrow

Card 1/2

137-58-6-11354

Clinkering Fine Concentrates by Pelletizing and Subsequent Roasting

temperature interval of incipient fusion and positive fusion of the mixture of concentrate and limestone makes it necessary to maintain strict adherence to roasting temperature schedules, since even an insignificant overheating of the P > 1200°C results in a strong fusion with one another and an impairment of reducibility. The maximum size of the limestone to be used as flux for P is ≤ 0.5 mm. Roasting of P on belt-type machines with application of solid fuel on the surface thereof presents significant shortcomings. Combustion of the fuel on the surface of the P is certain to cause overheating, which will result in fusion of portions of the surface. Nonuniform development of temperatures through the thickness of the bed has the same results.

A.Sh.

1. Ores--Processing
2. Pellets--Production

Card 2/2

BABUSHKIN, N. M.

AUTHOR: MILLER, V. YA., Prof., KHOKHLOV, V. G., cand. techn. science, PA - 2429
BABUSHKIN, N. M., eng.

TITLE: A. M. PАРFENOV "Sintering of Iron Ores" ("Agglomeratsiya zheleznykh rud". Russian)(Moscow, published by Metallurgizdat, 1954, 312 pages, 108 illustrations)

PERIODICAL: Stal', 1957, Vol 17, Nr 3, pp 286-288 (U.S.S.R.)

Received: 5 / 1957

Reviewed: 6 / 1957

ABSTRACT: The book reviewed contains a schematical description of the various methods of fracturing, preparing the blast furnace burden for sintering, the fundamental principles of the sintering process with blowing-through of air, evaluation of the quality of products, technological schemes, and projecting of sintering plants as well as a description of the equipment of such a plant. The first chapters are of too general a nature, when dealing with the size of the lumps of ore the influence exercised by this factor on the metallurgical properties of the sintering product receives too little attention. The theory of agglomeration is not substantiated by any experimental data. The deficiencies of this book are due to the fact that re-search work carried out abroad and in the U.S.S.R. was not dealt with with sufficient thoroughness, so that the book does not come up to the level of the present stage of both theory and practice.

Card 1/2

PA - 2429

A.M.PARFENOV "Sintering of Iron Ores"

ASSOCIATION: URAL Institute for Iron Metals (Ural'skiy institut chernykh metallov)

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

Card 2/2

SOV/137-58-10-20388

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 5 (USSR)

AUTHORS: Babushkin, N. M., Miller, V. Ya., Shamarin, V. A.

TITLE: Obtaining a Sinter of High Basicity from Akkerman Concentrates and Fines of Novo-Kiyevskiy Ores (Polucheniye aglomerata s vysokoy osnovnost'yu iz akkermanovskikh kontsentratov i vysevov Novo-Kiyevskikh rud)

PERIODICAL: Tr. N. -i. i proyekt. in-ta "Uralsmekhanobr", 1958, Nr 2, pp 42-55

ABSTRACT: The ores of the Akkerman and the Novo-Kiyevskiy occurrences are lean disseminated limonites (32 and 39% Fe, respectively) in an acid gangue. The Akkerman ores concentrate well by magnetic roasting. The Fe contents of the concentrate on dry magnetic separation are as much as 42-45% and as much as 55% by the wet process. The ores of the Novo-Kiyevskiy deposit do not lend themselves to effective concentration. In accordance with the Mekhanobr project, the composition of the ore component of the sinter mix at the Novo-Troitsk sinter plant will be the following: Akkerman concentrate (6-0 mm fraction) 73.3%;
Card 1/2 Novo-Kiyevskiy ore fines (12-00 mm fraction) 18.5%;

SOV/137-58-10-20388

Obtaining a Sinter of High Basicity (cont.)

blast-furnace flue dust 6.6%; scale 1.6%; design basicity of the CaO/SiO_2 sinter 0.9%. A study was made of the possibility of obtaining a fluxed sinter of high basicity from a mix of this composition. It is established that the basicity of the sinter may be increased to 1.5, and the optimum conditions for sintering this charge are studied. It is recommended that the upper limit for comminution of the limestone be reduced from 3 to 1-1.5 mm, and that mechanical screen shaking on self-balancing screens be introduced.

E. V.

1. Ores--Processing
2. Ores--Properties
3. Ores--Sintering

Card 2/2

SOV/137-59-3-5224

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 42 (USSR)

AUTHORS: Michkareva, V. I., Babushkin, N. M.

TITLE: Study of the Mineral Composition of Sintered Pellets of Pulverized Concentrates From the Kursk Magnetic Anomaly (Izucheniye mineral'nogo sostava obozhzhennykh okatyshey iz tonkoizmel'chennykh koncentratov KMA)

PERIODICAL: Tr. n.-i. proyekt. in-ta "Uralsmekhanobr" 1958, Nr 2, pp 56-62

ABSTRACT: The concentrate consists mainly of magnetite (77.6%) and quartz (16.85%) with insignificant amounts of impurities. The concentrate is pulverized to 70% of 0.07-mm undersize. In the preparation of microsections the pellets were hardened with a solution of bakelite in acetone. Microsections of both fluxed and unfluxed pellets sintered in a Tammann furnace at 1150, 1200, and 1250°C and in the sintering pan were investigated. Microscopic examination of the microsections showed that there are three zones in the pellets: The outer, oxidized, hematite zone 1 - 1.5 m (sic!) deep; the transitional, partly oxidized zone 1.5 - 2 m deep, and the inner, unoxidized zone. The oxidized zone contains but little of the fused phase, whereas the zone of partial

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SOV/137-59-3-5224

Study of the Mineral Composition of Sintered Pellets of Pulverized (cont.)

oxidation contains more of the liquid phase, and the strengthening of the pellets is attained through binding with slag. The oxidized zone of fluxed pellets consists of hematite, $\beta \cdot 2\text{CaO} \cdot \text{SiO}_2$ solid solution, hedenbergite, and Ca ferrites. All the lime enters into a chemical reaction with the concentrate.

A. P.

Card 2/2

BABUSHKIN, N.M. ; ROZHNOVSKIY, A.A.

Technical and economic grounds for selecting a method of
nodulizing Dzhezdinskiy manganese concentrates. Trudy
Uralmekhanobra no.5:132-137 '59. (MIRA 15:1)
(Marganets (Kazakhstan)—Manganese ores)
(Ore dressing)

18.2000

77001
SOV/133-60-2-1/25

AUTHORS: Babushkin, N. M., Shumarin, V. A., Lugovyykh, I. V.

TITLE: Agglomeration of Finely Ground Concentrates of Manganese Ore

PERIODICAL: Stal', 1960, Nr 2, pp 97-104 (USSR)

ABSTRACT: The authors investigate the possibilities and expediency of agglomeration and briquetting of manganese ore concentrates from Dzhezdinsk formation. The characteristic feature of these concentrates is the presence of considerable amounts of barium and sulfur. The chemical composition of initial material is shown in Table 1.

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Agglomeration of Finely Ground Concentrates
of Manganese Ore

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Table 1. Chemical composition of initial material
(%).

Material	Mn	MnO ₂	Fe	SiO ₂	Al ₂ O ₃	CaO	MgO	BaO	S	P	Moisture
Min Concentrate	27.48	22.81	5.73	28.30	3.62	1.22	0.30	3.31	0.41	0.062	3.16
Sample I	29.15	24.50	5.29	26.70	4.26	1.00	0.32	3.34	0.43	0.064	3.20

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Softening of concentrate (under small load) begins
at 1,140-1,150° C, and complete melting at 1,220° C.

Agglomeration of Finely Ground Concentrates
of Manganese Ore

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SOV/133-60-2-1/25

The weight per cubic meter of dry granular material for sample I = 1.95 ton/m³; for sample II, it = 1.89 ton/m³. The granular composition of samples was identical, and size of fractions generally was 0-1.0 mm. The authors discuss the following: (1) results of laboratory investigation of agglomeration; (2) results of industrial tests; (3) experimental manganese-silicon smelting from agglomerate and from briquettes; (4) technical and economical characteristics. The results of this investigation are given in Tables 3 and 5, and the following conclusions were made: The sintering and briquetting processes are practical, and the net cost of the manganese-silicon smelted from agglomerated products is somewhat lower when the sinter is used. Further investigation should be directed toward: (a) rational technology of production; (b) finding a low-priced cementing material for briquetting; (c) development of technology of drying and roasting

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Agglomeration of Finely Ground Concentrates
of Manganese Ore

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briquettes; (d) study of possibility of pelletizing finely ground concentrates.

Table 3. Results of laboratory investigations of sintering Dzhezdinck manganese ore concentrates. (A) Conditions and performance figures; (1) composition of charge (%): (a) Mn concentrate; (b) dry (0-2 mm); (c) dry return (0-10 mm); (d) dry small coke (0-3 mm); (2) moisture in charge (%); (3) initial temperature of charge ($^{\circ}\text{C}$); (4) height of charge bed (mm); (5) weight of 1 m^3 of dry granular material (ton/m^3); (6) vacuum (mm water column); (a) initial (b) average during the process; (7) temperature of waste gas ($^{\circ}\text{C}$): (a) maximum; (b) average during the process; (8) amount of waste gas ($\text{m}^3/\text{m}^2\text{-sec}$); (a) initial; (b) average during the process; (9) linear speed of sintering in mm/min; (10) specific productivity ($\text{ton}/\text{m}^2\text{ hr}$); (11) yield of sintering products (% of weight of charge); (12) yield of sound agglomerate % of weight of charge; (13) results of impact tests: yield (%) of fractions (mm); (14) drum tests: yield (%) of fractions

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Agglomeration of Finely Ground Concentrates
of Manganese Ore

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(mm); (15) chemical composition of agglomerate (%).

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(g)	118	111	116	115	102
	60	55	85	55	60
	40	15	15	15	40
	5,5	4,5	5,5	5,5	4,5
	5,8	5,07	6,03	6,35	7,0
	21	22	19	69	69
	250	250	250	250	250
	1,550	1,564	1,472	1,526	1,588
	991	969	515	990	1000
	962	903	457	924	915
	225	329	259	295	320
	102	115	103	141	131
	0,447	0,395	0,315	0,422	0,553
	0,2-3	0,188	0,152	0,234	0,351
	10,4	8,6	8,2	11,2	10,2
	0,48	0,58	0,59	0,70	0,47
	86,7	88,9	84,7	84,5	85,5
	49,5	72,7	68,3	68,5	48,2
	51,9	65,8	60,6	52,9	48,1
	37,2	20,5	31,7	40,8	41,1
	10,9	13,7	7,7	6,3	10,8
	44,2	28,3	42,1	51,8	33,3
	26,8	33,7	29,3	25,0	33,2
	29,0	38,0	28,6	21,2	33,5
	29,21	5,15	29,52	29,30	30,05
	5,09	—	5,24	4,99	—
	0,27	—	0,30	0,31	0,26
	0,06	—	0,06	0,06	0,08

Agglomeration of Finely Ground Concentration
of Manganese Ore

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SOV/133-60-2-1/25

	114	113	119
(A)			
(1)	100	85	72
(2)	0.0	15	28
(3)	5.5	3.5	5.5
(4)	8.1	6.2	5.5
(5)	21	20	18
(6)	250	250	250
(7)	1,421	1,501	1,502
(8)	985	970	1010
(9)	997	910	975
(10)	315	310	275
(11)	1.3	1.7	1.02
(12)	0.390	0.434	0.415
(13)	0.912	0.228	0.221
(14)	10.1	1.4	1.5
(15)	0.72	0.64	0.58
(16)	55.8	25.0	55.8
(17)	53.1	55.8	53.5
(18)	63.0	52.2	51.4
(19)	26.7	38.4	36.3
(20)	9.4	9.4	13.3
(21)	41.3	40.7	50.0
(22)	29.0	31.2	23.2
(23)	29.7	29.1	26.8
(24)	29.05	29.37	29.21
(25)	4.85	5.22	5.32
(26)	0.35	0.37	0.24
(27)	0.15	0.16	0.10

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Agglomeration of Finely Ground Concentrates
of Manganese Ore

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SOV/133-60-2-1/25

Table 5. Results of briquetting of Dzhezdjuck manganese ore concentrates. (1) Nr experiment; (2) composition of charge (%); (3) concentrate of fractions (mm); (4) coke (0-1 mm); (5) cementing; (6) residual liquid from distillation of alcoholic liquors; (7) pitch; (8) compacting pressure (kg/m^2); (9) resistance of briquettes to compression (kg/cm^2); (10) moist; (11) dry.

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1	3		2		5		8	9	
	0-2	0-0.1	4	6	7	10		11	
	1	100	—	—	—	—		250	2.6
2	100	—	—	—	—	750	6.5	12.5	
3	60	40	—	—	—	750	—	49	
4	50	50	—	—	—	750	—	56	
5	40	60	—	—	—	750	—	43	
6	—	100	—	—	—	750	—	40	
7	100	—	—	1	—	750	4-5	28	
8	100	—	—	2	—	750	4-5	44	
9	100	—	—	3	—	750	4-5	109	
10	100	—	—	4	—	750	4-5	147	
11	100	—	—	4	—	500	—	110	
12	100	—	—	4	—	300	—	97	
13	100	—	—	5	—	300	—	120	
14	100	—	—	4	—	250	—	78	
15	100	—	—	5	—	250	—	106	
16	50	50	—	1	—	750	—	88	
17	50	50	—	2	—	750	—	115	
18	42.5	42.5	15	2	—	250	—	103	
19	42.5	42.5	15	3	—	250	—	143	
20	100	—	—	—	3	500	—	42	
21	100	—	—	—	5	500	—	75	
22	100	—	—	—	6	500	—	91	
23	100	—	—	—	6	300	—	61	
24	100	—	—	—	6	250	—	56	
25	50	50	—	—	5	500	—	110	
26	50	50	—	—	6	500	—	152	
27	42.5	42.5	15	—	6	250	—	67	
28	42.5	42.5	15	—	7	250	—	90	

77601
SOV/133-60-2-1/25

Table 5

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Agglomeration of Finely Ground Concentrates
of Manganese Ore

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SOV/133-60-2-1/25

The work was done at the Ural Scientific Research Institute for Mechanical Concentration of Minerals (Uralsmekhanobr) and Central Scientific Research Institute of Ferrous Metallurgy (TsNIIChM). The industrial tests were made at the plant NI of Goroblagodatsk Mining Administration (Goroblagodatskoyl rudoupravleniye). Credit is given for their participation to L. G. Moshinskiy, V. N. Peshkov, A. M. Gurevich, G. B. Shirer, S. D. Shifrin, N. P. Lyakishev, T. V. Lugovykh, A. A. Rozhnovskiy, and T. V. Teplyakova. There are 8 tables; 4 figures; and 5 Soviet references.

ASSOCIATION: Uralsmekhanobr

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BABUSHKIN, N.M.; MILLER, V.Ya.

Effect of kind and size of fuel on the rate of the sintering
process and quality of the sinter. Stal' 22 no.2:101-106 F
'62. (MIRA 15:2)

(Sintering)

ACCESSION NR: AR4014419

S/0124/64/000/001/B097/B097

SOURCE: RZh. Mekhanika, Abs. 1B628

AUTHOR: Babushkin, N. M.; Timofeyev, V. N.

TITLE: The analysis of fuel combustion within the layer of sintering charge

CITED SOURCE: Sb. nauchn. tr. Vses. n.-1. in-ta metallurg. teplotekhn., no. 7, 1962, 3-16

TOPIC TAGS: combustion, sintering charge, agglomeration combustion

TRANSLATION: The author shows that in comparison with fuel combustion within a general layer, the combustion within a layer of sintering charge exhibits some peculiarities. The charge consists basically of the totality of "inert" material particles within which the fuel particles are distributed more or less uniformly (they represent ~3-7 weight % or ~8-12 volume %). With the burning out of hydrogen the fuel particles decrease in size without producing an ash layer, and since their size is actually half as small as the particles of ore, very favorable conditions result for the access of oxygen to the reaction surfaces.

Since the particles of the charge have a considerable heat capacity and low

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ACCESSION NR: AR4014419

resistance, the heat exchange between the gas (air) and the sinter occurs almost completely at a very low height. This fact guarantees a high degree of heat regeneration, limits the height of the combustion zone, and leads to the presence of surplus oxygen within the layer of the sintering charge. The process is also characterized by the presence of the oxygen from iron oxides (and from manganese oxides during the sintering of manganese ores), and by the enrichment of the combustion products by carbon dioxide from the decomposition of carbonates within the charge.

The author derived an equation for the combustion speed of individual fuel particles (the speed of decrease of the dimensionless diameter) $dx/d\tau$

$$\frac{dx}{d\tau} = -k\beta R O_2 \quad (1)$$

where k - a certain quantity which is constant for the given conditions, β - stoichiometric factor, R - the velocity constant of the reaction, and O_2 - the oxygen concentration within the flow. Since the combustion process does not occur throughout the entire volume but only within a relatively narrow reaction zone which is moving constantly in the direction of the air (gaseous) flow and within which the composition of the gaseous phase is changing continuously across the height of the combustion zone, the author derived a relation for the oxygen concentration within the reaction zone. Together with Equation (1), it represents the kinetic combustion conditions. Equations derived for the gas production within the layer of the

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ACCESSION NR: AR4014419

sintering charge allow the analysis of the combustion process under various conditions of its organization, and they can be also used during the design of complex system for the automatic control of sintering devices. Yu. V. Polezhayev.

DATE ACQ: 18Feb64

SUB CODE: FL, ML

ENCL: 00

Card 3/3

DURNOV, V.K.; BABUSHKIN, N.M.; PUSHKASH, I.I.; Primalni uchastiye:
KOLMOGOPOV, A.V.; KLEPTSIN, V.G.; MASLENNIKOVA, E.G.;
GORYACHEVA, A.V.; BARAKHVESTOV, V.S.; RASIN, B.S.; ZEMLYAKOV,
A.A.; BABOSHINA, G.V.

Distribution of the temperature of the hot blast in the
tuyere passage of the blast furnace. Stal' 25 no.3:205-209
Mr '65. (MIRA 18:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut metallurg-
icheskoy teplotekhniki i Nizhne-Tagil'skiy metallurgicheskiy
kombinat (for Durnov, Babushkin, Pushkash).

LAZAREV, B.L.; BOKOVIKOV, B.A.; BABUSHKIN, N.M.; TIMOFEYEV, V.N.;
CHERVOTKIN, V.V.; PRIVALOV, S.I.

Heat exchange and reduction in the stack of a furnace operating
on 100% fluxed sinter. Stal' 25 no.6:487-492 Je '65.

(MIRA 18:6)

1. Nizhne-Tagil'skiy metallurgicheskiy kombinat i Vsesoyuznyy
nauchno-issledovatel'skiy institut metallurgicheskoy teplotekhniki.

BABUSHKIN, N.P.; MIN'KOVA, V.S.; BEZRUKOV, V.A.; STREL'TSOV, V.V.

Removal of sulfur compounds from fuel gases in a fluidized bed of cinder at high temperatures. Izv. vys. ucheb. zav.; khim. i khim. tekh. 7 no.3:445-449 '64.

(MIRA 17:10)

1. Ivanovskiy khimiko-tekhnologicheskii institut, kafedra khimicheskogo mashinostroyeniya.

BABUSHKIN, N.Ya., kand.biol.nauk; CHUGUNOVA, N.I., kand.biol.nauk

Distribution of shad in the southern and central Caspian and
methods of locating them. Trudy VNIRO 36:132-166 '58.

(Caspian Sea--Shad)

(MIRA 12:4)

BABUSHKIN, N.Ya. [deceased]

Biology and fishery of the Caspian Sea beluga. Trudy VNIRO
528183-258 '64. (MIRA 17:10)

1. AzerNIRL.

BABUSHKIN, S. (g. Murom)

Automatic cutout for a ferroresonance stabilizer. Radio
no.2:46 F '60. (MIRA 13:5)
(Voltage regulators) (Electric cutouts)

15

BABUSHKIN, S. A.

PROCESSES AND PROPERTIES INDEX

Simultaneous Determination of Carbon, Hydrogen, and Heat Capacity of Organic Substances. (In Russian.) S. A. Babushkin and E. A. Driyan-Rampel. *Zhurnal Analiticheskoi Khimii* (Journal of Analytical Chemistry), v. 8, Mar.-Apr. 1948, p. 123-130. Describes new calorimetric-bomb method requiring about 2 hr. Typical results are tabulated. 14 ref.

COMMON ELEMENTS

COMMON VARIABLES INDEX

OPEN MATERIALS INDEX

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

AUTOMATIC LETTER INDEX

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D A B U S H K L N S A

28(1) PHASE I BOOK EXPLOITATION SOV/2702

Akademiya nauk SSSR. Institut avtomatiki i telemekhaniki. Seminar po pnevmogidravlicheskoy avtomatike. 1st. Moscow, 1957

Sistemy, ustroystva i elementy pnevm- i gidronastomatiki: (bornil) Pneumatic and Hydraulic Circuits, Devices, and Elements in Automation. (Collection of Papers) Moscow, Izd-vo AN SSSR, 1959. 233 p. Errata slip inserted. 2,700 copies printed.

Resp. Ed.: M. A. Ayzerman, Doctor of Technical Sciences, Professor; Ed. of Publishing House: A. A. Tal', Tech. Ed.: T. P. Polyakova.

PURPOSE: This collection of papers is intended for scientific research and engineers in the field of design and construction of pneumatic and hydraulic equipment and accessories for automation.

COVERACE: This collection contains papers read at the Seminar on Pneumatic and Hydraulic Devices for Automation, May 28, 1957. The collection is divided into the following groups: 1) newly developed pneumatic and hydraulic regulating units, transmitters and hydraulic devices, including regulating units, transmitters and transducers, actuating mechanisms, special-purpose devices, and secondary devices (for automation), such as pneumatic and hydraulic relays (for automation), such as controlled and permanent nozzles and diaphragms. No personalities are mentioned. References follow several of the papers.

Podgoyetskiy, M. L., and E. M. Brazerman (Moscow). KETsMA Three-component regulating Unit 50

Dvortskiy, V. M. (Moscow). Small-size Hydraulic Regulating Unit. IAT AN SSSR 57

Zagladatsev, S. M., and V. A. Bukhadze (Moscow). Problems in Constructing Primary Instruments -- Differential Pressure Transmitter With Pneumatic Force Compensation 61

This paper is an analytical discussion of differential transmitters dealing with their sensitivity, errors, and reliability.

Krementuln, Yu. V. (Moscow). Electropneumatic Transducers, IAT AN SSSR 77

Dmitriyev, V. M. (Moscow). Static Characteristics of a Pneumatic Relay With Constant Pressure Drop in Nozzles of a Pneumatic 86

This paper discusses the static characteristics of a back-pressure type pneumatic relay with indicators that are not sensitive to minute gap changes.

Zasedatsev, S. M., and V. A. Bukhadze (Moscow). Differential Pressure Transmitters With Pneumatic Force Compensation (Review of Non-Soviet Designs) 91

Tammy, V. P. (Moscow). General-purpose Hydraulic Power Servodrive 99

Arkhangel'skiy, A. F. Hydraulic Universal Variable-speed Transmission (UHS) 103

This paper describes an axial-piston variable-speed transmission. Its technical specifications and fields of application are discussed.

Rabuhin, S. A. (Leningrad). Equations for a Stabilizing System With a Pneumatic Actuator Connected With a Control Device by Hydraulic Relay. (Collection of Papers) Moscow, Izd-vo AN SSSR, 1959. 112

Equations of the motion of the actuator piston and elements of the control device are given. Design examples are presented.

BABUSHKIN, S. A

PHASE I BOOK EXPLOITATION SOV/4630

Leningrad. Universitet

Mekhanika (Mechanics) [Leningrad] 1960. 254 p. (Series: Its: Uchenyye zapiski, no. 280. Seriya matematicheskikh nauk, vyp. 35) Errata slip inserted. 1,725 copies printed.

Sponsoring Agency: Leningradskiy ordena Lenina gosudarstvennyy universitet imeni A. A. Zhdanova.

Resp. Ed.: N. N. Polyakhov, Professor; Ed.: T. I. Kulagina; Tech. Ed.: Ye. G. Zhukova.

PURPOSE: This collection of articles is intended for scientists, engineers at NII's (scientific research institutes) and design offices and also for students of advanced courses in related fields.

COVERAGE: The collection consists of original investigations in the field of modern mechanics including general mechanics, theory of elasticity, and hydroaerodynamics. No personalities are mentioned. References accompany all articles except one.

Card 1/5

16.8000(1031, 1121, 1132)

23154
S/024/61/000/003/002/012
E140/E463

AUTHORS: Babushkin, S.A. and Ginzburg, I.P. (Leningrad)

TITLE: On the theory of nonlinear combined and autonomous control systems

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1961, No.3, pp.14-30

TEXT: The article attempts to determine the nature of a computer (analogue) for an automatic control system in which k controllers regulate that many system coordinates, such that absolute invariance of the regulated parameters and their autonomy with respect to the other coordinates of the system be obtained. The system considered in all generality is shown in Fig.1, where A is the object, B the computer, the small blocks labelled $1, \dots, \nu, k$ are the regulators. Further y_ν ($\nu = 1, \dots, k$) are the coordinates of the object in k -space, $x_{j\nu}$ ($j_\nu = 1, \dots, n_\nu$) describe the motion of the regulators, $x_{n\nu}$ ($\nu = 1, \dots, k$) is the action applied by the ν -th regulator to the object, $g_\nu(t)$ is the input programme to the computer, $\theta_\nu = y_\nu - g_\nu(t)$ are error signals (physically
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measured) $f_{\nu}(\nu)(t)$ ($\nu = 1, \dots, p$; $\nu = 1, \dots, k$) are external perturbations acting on the object and regulators, and $x_1(\nu)$ are the computed control signals. Finally, Φ_{ν} are the functions generated by the computer. Such a system is described by a system of differential equations consisting of three groups of equations: equations describing the motion of the controlled object and the controllers, equations describing the motion of the computer, and k equations describing the errors. It is assumed that the equations of the object are fixed while the equations of the regulators are only slightly varying. The physical measurements and their conversion to computer input signals are assumed inertialess. The object and regulator functions and their partial derivative as well as the computer functions and partial derivative are assumed continuous and bounded over the entire range of possible variation. The computer has k equations for solving the k input signals to the regulators. In these equations there are initially undetermined equations describing as yet unknown corrective networks. The problem posed by the paper can now be stated more precisely. It is required to determine the conditions placed on the computer functions Φ_{ν} .

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such that

$$y_{\nu} \equiv g_{\nu}(t) \quad (\nu = 1, 2, \dots, k) \quad (1.2)$$

i.e. that the motion of the object identically correspond to the input programme, as well as the conditions on the equations of the individual regulators and the overall automatic control system, in order that the motion defined by this solution be stable. Such motion is termed: programme motion. Eq.(1.2) permits the system of differential equations of the general system to be simplified by elimination of the static error equations. The second section of the article is concerned with the derivation of the simplified equations. This simplification depends on the fact that for an approximately invariant system, the error terms in the object and regulator equations are negligible (which is not true for the computer equations which depend precisely on the error values). Then a subset of the equations simplify to an autonomous system of N differential equations in N variables, which can therefore be integrated independently of the remaining k equations of the system. The problem of determining the
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computer function is solved by first substituting the functions of time found for the simplified object and regulator equations in the general expression for the as yet unknown computer functions. By the formulation itself of the problem, the steady state values of the errors are arbitrarily small. Then the functions Φ_v can be expanded close to the plane in which the errors and their derivative vanish in a Taylor series in variations of the error from this plane. This implies that absolute invariance of the system will occur only when the functions Φ_v vanish identically and the partial derivatives with respect to the errors are bounded with substitution in them of the functions of time $\bar{x}_{jv}(v)$, where the bar indicates the solution of the simplified system. Examining further the conditions placed on the functions Φ_v , it is found that one sufficient solution to the problem is equivalent to a control system using perturbation only. No system operating on deviation alone can satisfy the criteria of absolute invariance and autonomy. The author then derives a system of variational equations which constitute the basis for the final stage of the solution. In the final section, the author examines the question of stability of the motion defined by the solution
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obtained. The stability problem reduces to the study of the stability of the zero solution of an homogeneous system of linear differential equations with variable coefficients. In a particular case the coefficients of the equations become constants. It is this particular case which is examined in detail in the article. The examination is carried out in two stages, firstly for each of the k coordinates independently and then the system as a whole. The stability conditions are expressed in terms of the roots of algebraic equations. It is found that the stability depends not only on the form of control function, but on the parameters of the controlled object and the regulators. Thus conditions can be obtained for the physical realizability of the system. A brief remark on the general case (where the stability coefficients are variable) indicates that the dependence on the system parameters holds here as well. In conclusion the author mentions various related questions which have not been treated in the article. The possibility of substantially simplifying the form of the differential equations defining the regulation function or even of excluding from these equations a part of the information

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external to the the ∇ -th coordinate system; the elimination of mutual couplings between the regulators; the possibility of using self-adjusting corrective networks in the computer and the inclusion of nonlinear equations in the latter. There are 3 figures and 16 references: 12 Soviet-bloc and 4 non-Soviet-bloc. The four references to English language publications read as follows: Moore, I.R. Proc.IRE, 1951, v.39, No11, pp.1421-1432; Baksenbom, A.S., Hood, R., NACA, Rep.980, 1950; Aseltine, I.A., Manicini, A.R., Sarture, C.W., Trans. IRE on Automatic Control, PGAC-6, 1958; Margolis, M., Leondes, C.T., IRE Weson Convention Record, 1959, pt.4, p.104.

SUBMITTED: January 23, 1961

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 Pae-2/ IJP(c) GW/BC/AST/GS S/0000/64/000/000/0065/0083 84

ACCESSION NR: AT5004113

AUTHOR: Babushkin, S. A.

B+1

TITLE: Mathematical conditions of physical realization in invariant automatic and gyroscopic systems (7)

SOURCE: Vsesoyuznoye soveshchaniye po teorii invariantnosti i yeye primeneniyu v avtomaticheskikh sistemakh, 2d, Kiev, 1962. Teoriya invariantnosti v sistemakh avtomaticheskogo upravleniya (Theory of invariance in automatic control systems); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 65-83

TOPIC TAGS: differential equation, linear differential equation, gyroscope, invariant system, automatic control system, physical realization, earth satellite

ABSTRACT: The author formulates certain mathematical conditions for the physical realization of invariant dynamic systems. An automatically regulated system satisfying the following first-order differential equations is considered:

$$\begin{aligned} \dot{y}_i &= y_{i+1} \quad (i = 1, 2, \dots, m-1); \\ \dot{y}_m &= \psi_m(y_1, \dots, y_m; x_N; f(t), \dots, f(t)); \\ y_i &= \psi_i(y_1, \dots, y_m; \dot{y}_m; f(t), \dots, f(t)) \quad (i = m+1, \dots, M-1); \end{aligned}$$

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$$y_M = \varphi_M(y_1, f(t));$$

$$\sum_{\alpha=1}^N a_{\alpha} x_{\alpha} + \varphi_{\alpha}(x_1, \dots, x_N; y_1, \dots, y_M; z_K; f(t), \dots, f(t)) = 0 \quad (\alpha = 1, \dots, N);$$

$$\sum_{\sigma=1}^K b_{\sigma} z_{\sigma} + \vartheta_{\sigma}(z_1, \dots, z_K; x_1, \dots, x_N; y_1, \dots, y_M; f(t), \dots, f(t)) = 0$$

($\sigma = 1, \dots, K$).

where y_M is the error of the regulator, x_N the regulated motion, z_K is a programmed, given variable, $f_1(t)$ certain matrix functions of time, and the remaining unknowns are parametric quantities defined in the paper. Mathematical conditions for the physical realization are derived in the form

$$\ddot{\alpha} + k^2 \alpha = 0, \quad \ddot{\beta} + k^2 \beta = 0.$$

$$\Delta \xi_1 = -\omega_x \sin(K + \Delta \xi_1) + \omega_z \cos(K + \Delta \xi_1) - [-\omega_x \sin K + \omega_z \cos K];$$

$$\Delta \xi_2 = -\frac{1}{\cos(\varphi + \Delta \xi_1)} [\omega_x \cos(K + \Delta \xi_1) + \omega_z \sin(K + \Delta \xi_1)] + \frac{1}{\cos \varphi} (\omega_x \cos K + \omega_z \sin K);$$

$$\Delta \xi_3 = \operatorname{tg}(\varphi + \Delta \xi_1) [\omega_x \cos(K + \Delta \xi_1) + \omega_z \sin(K + \Delta \xi_1)] - \operatorname{tg} \varphi (\omega_x \cos K + \omega_z \sin K).$$

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ACCESSION NR: AT5004113

The problem of the physical realization of linear systems of differential equations is considered in part 2 of the paper. The remainder of the paper treats the special case of the physical realization of gyroscopic systems moving close to the surface of the earth. Orig. art. has: 54 formulas and 2 figures.

ASSOCIATION: None

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ENCL: 00

SUB CODE: MA, NG

NO REF SOV: 015

OTHER: 000

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L 46024-66 EEC(k)-2/EWT(d)/FSS-2 LJP(c) ASI/EC/GD
ACC NR: AT6017609 (N) SOURCE CODE: UR/0000/65/000/000/0064/0077

AUTHOR: Babushkin, S. A.

ORG: none

59
B+1

TITLE: Adaptive system with a nonlinear model

SOURCE: Vsesoyuznaya konferentsiya po teorii i praktike samonastroivayushchikhsya sistem. Ist, 1963. Samonastroivayushchiesya sistemy (Adaptive control systems); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 64-77

TOPIC TAGS: self adaptive control, automatic spacecraft control, variable mass system, special purpose computer

ABSTRACT: Synthesis of the controller of a nonlinear adaptive system with outside disturbances is described. Control law equations are derived from the original state equations using variational methods. The variables are divided into two basic groups: directly observable and nonobservable. The latter are expressed as functions of the first. The problem of flight control of a variable mass body moving in the vicinity of Earth is considered as an example. A set of equations serving as the basis of the control law is derived and a block diagram of a special purpose computer to implement this control law is presented. Orig. art. has: 2 figures, 55 formulas.

SUB CODE: 13,22/ SUBM DATE: 22Nov65/ ORIG REF: 012/ OTH REF: 001

Card 1/1 *ad*

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Concerning the theory of nonlinear systems of combination and
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