

USSR

TSYGANOV, G. A., *Khimiya i Tekhnologiya Proizvodstva Molibdena*, Tashkent, FAN Press, 1970, 88 pp

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- D. I. Zakarchevnyy, I. A. Svist, B. I. Polyakov, A. A. Kal'kov, and G. A. Tsyganov, Report 2. Study of Influence of Various Factors on Crystallization Process of Ammonium Paramolybdate. 57
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1/2 041 UNCLASSIFIED PROCESSING DATE--04DEC70
 TITLE--COMBUSTION RATE ACCELERATION WITH THE AID OF ADDITIONS FORMING A
 MOLTEN LAYER ON THE SURFACE OF THE CHARGE -U-
 AUTHOR--(03)-BAKHMAN, N.N., TSYGANOV, S.A., ZAKHAROV, V.B.
 COUNTRY OF INFO--USSR
 SOURCE--FIZIKA GORENIIA I VZRYVA, VOL. 6, MAR. 1970, P. 98-102
 DATE PUBLISHED----MAR70
 SUBJECT AREAS--MATERIALS, PROPULSION AND FUELS
 TOPIC TAGS--METHYLMETHACRYLATE, AMMONIUM PERCHLORATE, STYRENE, COMBUSTION
 RATE, POTASSIUM CHLORIDE, LITHIUM FLUORIDE, PROPELLANT ADDITIVE, SOLID
 PROPELLANT COMBUSTION
 CONTROL MARKING--NO RESTRICTIONS
 DOCUMENT CLASS--UNCLASSIFIED
 PROXY FICHE NO----FD70/605017/F01 STEP NO--UR/0414/70/006/000/0098/0102
 CIRC ACCESSION NO--AP0140765
 UNCLASSIFIED

UNCLASSIFIED

PROCESSING DATE--04DEC77

2/2 041
CIRC ACCESSION NO--AP0140765

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT, MOTION PICTURE OBSERVATIONS SHOWING THAT THE COMBUSTION RATES OF AMMONIUM PERCHLORATE MIXTURES WITH POLYSTYRENE AND POLYMETHYLMETHACRYLATE CAN BE INCREASED BY SMALL KCL AND LIF ADDITIONS WHICH FORM A MOLTEN LAYER ON THE SURFACE OF THE CHARGE. THE EFFECTS OF THE FUEL OXIDIZER RATIO, THE SIZE OF THE PARTICLES, THE AMOUNT OF ADDED KCL OR LIF, AND PRESSURE ON THE COMBUSTION RATES ARE DISCUSSED. IN THE PRESENCE OF EXCESS OXIDIZER, KCL AND LIF ADDITIONS ARE FOUND TO INCREASE THE COMBUSTION RATES OF THESE MATERIALS UP TO THREE TO FOUR TIMES, AND THIS EFFECT IS GREATER WHEN THE ADDITIONS ARE FINER DIVIDED. A THEORETICAL EXPLANATION IS PROPOSED FOR THE RESULTS.

UNCLASSIFIED

Acc. Nr. AA0034551

Abstracting Service: CHEMICAL ABST. 4-70

Ref. Code 0000

70060e Rapid-drying foundry-core binders from organic by-products. Borskaya, E. A.; Kobzeva, Z. A.; Zotov, A. B.; Egorycheva, G. V.; Alakarova, I. P.; Niseleva, M. S.; Kirilov, M. I.; Andrienko, B. A.; Tsvetkov, V. I. (Scientific Research Institute of the Technology of the Automotive Industry) Brit. 1,177,938 (Cl. B 22c), 14 Jan 1970, Appl. 13 Sep 1968; 2 pp. Binders having several years shelf life, for sand cores hardening in <1.5 min in core boxes heated to 240-60°, are obtained by mixing 60-70 parts sulfite liquor by wt. with 15-30 parts polyat. alc. mother soln. from pentaerythritol production, and adding to the mixt. 8-15 parts of an oxidn. catalyst slowly during 30-60 min with stirring or other means to suppress foam and prevent temps. >60-70°. Suitable sulfite liquor or lye has 1.27 sp. gr. Hydrolysates of corn cobs or sawdust can be substituted for it. Suitable mother soln. contains saccharides 11-13, pentaerythritol 8-12, resins 4-10, acids 2-5, and H₂O 60-75%, and has at least 1.16 sp. gr. The oxidn. catalyst can be H₃PO₄, a persulfate, or H₂O₂, and if the latter, not over 3% of a 30% aq. soln. should be used, with a H₂O-cooling jacket for cooling below 25°. The mixed binder should have 1.25-1.3 sp. gr. and 4-4.8 pH. Cores thus bonded retain useful properties 3-4 days. When they also contain up to 3% clay, hardening is faster than 1.5 min and the core strength is increased 25% or more. The collapsibility of the cores after castings are cooled is not impaired by these binders. George F. Comstock

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Acc. Nr:

AP0049532

Abstracting Service:

CHEMICAL ABST. 5/70

Ref. Code:

UR 0370

104472h Phase diagram of a hafnium-aluminum system. Tsyganova, I. A.; Tytkina, M. A.; Savitskii, E. M. (USSR). *Izv. Akad. Nauk SSSR, Metal.* 1970, (1), 160-3 (Russ). Alloys were prepd. from iodide Hf with a purity of 99.8% and Al of AV-000 type with a purity of 99.99%. Annealing was at 540 and 1000° for 500 hr. There is unlimited soly. of the components in the liq. state. Hf_2Al_3 melts congruently at $1590 \pm 25^\circ$, the microhardness of the compd. is 740 kg/mm², elec. resistivity is 170×10^{-4} ohm cm, and the transition to the superconducting state is at 7.65°K. $HfAl$ melts congruently at 1800°, its microhardness is 800 kg/mm², elec. resistivity is 500×10^{-4} ohm cm, and the transition point is at 8.2°K. Hf_2Al_3 is formed by a peritectic reaction at $1640 \pm 25^\circ$, its microhardness is 670 kg/mm², elec. resistivity is 60×10^{-4} ohm cm, and the transition point is at 7.8°K. $HfAl_2$ melts congruently at $1050 \pm 25^\circ$, its microhardness is 740 kg/mm², and elec. resistivity is 75×10^{-4} ohm cm. $HfAl_3$ melts congruently at 1590°, its microhardness is 350 kg/mm², and the elec. resistivity is close to that of Al. The formation of Hf_2Al_3 was not confirmed. There are 4 eutectics between the resp. compds. in the system: at 1530, 1550, 1495, and 1540°. The m.p. of Hf when alloyed with Al rapidly de-

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creases from 2222° to 1530° (the eutectic transition), the max. soly. of Al in β -Hf being 33-5 atom %. The soly. of Al in α -Hf decreases from 30 atom % in alloys quenched at a temp. close to the m.p., to 12.5 atom % at 1000°. In the region of solid solns. the alloying with Al is accompanied by an increase in hardness from 170 kg/mm² for pure Hf to 420 kg/mm² for an alloy at the boundary of satn. and the elec. resistivity increased from 36 to 170 microhm cm for the same alloys. L. Höll

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UDC 550.8:528:556.3

NIKIMIN, M. R., TSYGANOVA, K. N.

"Prospects for the Use of Saline Underground Waters for Water Supply in the Southern Regions of the USSR and Methods of Their Mapping"

Moscow, Razvedka i Okhrana Nedr, No 8, 1972, pp 36-43.

Abstract: A study was performed in 1966-1968 to accumulate data on the distribution, deposition conditions, quality and availability of salty and brackish underground waters. A prognostic evaluation of useable resources was made for the arid and semiarid areas of the USSR, where the use of this water is expedient. A map is presented for the southern regions of the USSR, indicating that the water resources suitable for commercial and home use could be at least doubled by the installation of desalinizing plants for underground water. A table of regions is presented, indicating areas which have sufficient supplies of underground waters with various salt contents to allow desalination by various methods to provide water for commercial, domestic and irrigation purposes.

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TSYGANOVA, N.V.

JPRS 58136
2 Feb 73

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JPRS 58136
2 February 1973

EVOLUTION OF CHANGES IN THE LOOSE CONNECTIVE TISSUE UNDER
THE INFLUENCE OF AN OPTICAL QUANTUM GENERATOR

UDC 615.049.19.015:611-018.2

Article by A. A. Vishnevskiy Jr. and N. V. Tsyganova by the Institute of Surgery, Izmir A. V. Vishnevskiy, AMS, Moscow, USSR; Iosob, Kupchinskaya, Kaluzhskaya i Anesteziologya, Moscow, No 5, 1972, pp 13-17

The action of laser beams on skin is of great practical interest. However, the laser beam also penetrates to deeper layers of tissue. At the present time there are articles in the Soviet and foreign literature describing the reaction of skin to laser irradiation. (V. M. Shevchenko and B. Ya. Goldshmid; Klein and Fine; Goldman; Lior et. al.). However, these works do not present a study of the reaction of the subcutaneous cells on the action of the laser beam.

There are numerous articles in Soviet literature describing the action of radiologic radiation and thermal burns on loose connective tissue (V. V. Shukol'tsov, 1958; 1960; 1970; L. A. Ariflanova; L. B. Brill). In these studies the reaction of all the cellular and fiber elements of the loose connective tissue is described.

The goal of the present study is to describe the evolution of morphologic changes in the loose connective tissue caused by the irradiation of the skin with an optical quantum generator.

The work was carried out on 140 nonbred white mice of both sexes. Irradiation was given with a defocused laser QG of Soviet production. The active material was glass activated by a neodym (λ equals 10⁻³, lambda equals 1.06 microns). The density of irradiation was 10.2, 48 and 105 dj/cm². Prior to irradiation the mice were shaved in the area of the spine. After irradiation the mice were killed by decapitation 2, 24, 48 hours and 5, 7, 10, 20 and 30 days later. Skin preparations were made of subcutaneous cells in tissue taken from irradiated areas. The preparations were fixed in 10 percent neutral formalin and stained with iron hematoxylin by Yasvokov's method, with toluidine blue, with picrofuchsin and prepared in aliver according to Ivov.

Preparations of loose connective tissue from healthy mice were used as controls.

I/2 019

UNCLASSIFIED

PROCESSING DATE--30OCT70

TITLE--HYGIENIC ASSESSMENT OF VEGETABLE DUST IN CELLULOSE CARDBOARD

INDUSTRY -U-

AUTHOR--TSYGANOVSKAYA, L.KH.

COUNTRY OF INFO--USSR

SOURCE--GIGIYENA I SANITARIYA, 1970, NR 6, PP 26-31

DATE PUBLISHED--70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--RESPIRATORY SYSTEM DISEASE, INDUSTRIAL HYGIENE, CELLULOSE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--2000/1860

STEP NO--UR/0240/70/000/006/0026/0931

CIRC ACCESSION NO--AP0125471

UNCLASSIFIED

2/2 019

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSIGN NO--AP0125471

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A STUDY OF THE SANITARY HYGEINIC LABOUR CONDITICNS PREVAILING AT THE TIME OF THE CUTTING OF REEDS IN THE CELLULOSE CARDBOARD INDUSTRY SHOWED THE MAIN NOXIOUS EFFECT TO BE CAUSED BY ORGANIC DUST OF VEGETABLE ORIGIN. EXAMINATION OF WORKERS REVEALED A HIGH INCIDENCE OF LESIONS IN THE MUCOUS MEMBRANES OF THE UPPER RESPIRATORY TRACTS WITH PREVALENCE OF SUBATROPHIC FORMS, DISTURBANCES OF EXTERNAL RESPIRATION AND DEVELOPMENT OF POSITIVE ALLERGIC SKIN REACTIONS UNDER THE ACTION OF EXTRACTS OF CARDBOARD AND, ESPECIALLY, THAT OF REED DUST. THE ALLERGENIC PROPERTIES OF REED AND CARDBOARD DUST WERE CONFIRMED EXPERIMENTALLY. FACILITY: ASTRAKANSKIY MEDITSINSKIY INSTITUT.

UNCLASSIFIED

1/2 019 UNCLASSIFIED PROCESSING DATE--16OCT70
TITLE--LOCAL LEVELS IN HEXAGONAL SELENIUM --U-

AUTHOR--(04)-KOLOMYETS, B.T., BANDROVSKAYA, I.K., TSYGELNAYA, N.N.,
KHODOSEVICH, P.K.
COUNTRY OF INFO--USSR

SOURCE--FIZ. TEKH. POLUPROV. 1970, 4(2), 387-8

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY, PHYSICS

TOPIC TAGS--SELENIUM, ACTIVATION ENERGY, FORBIDDEN BAND

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1995/0937

STEP NO--UR/0449/70/004/002/0387/0388

CIRC ACCESSION NO--AP0116446

UNCLASSIFIED

2/2 019

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0116446

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. EXPTL. DATA INDICATE, CONTRARY TO ASSUMPTION, THAT THERE ARE NOT 2 OR 3 GROUPS OF DISCRETE LOCAL LEVELS IN THE FORBIDDEN BAND OF HEXAGONAL SE; THE TEMP. DEPENDENCE (T EQUALS 83-300DEGREEK) OF THE COND. (DETD. BY A CYCLING METHOD) INDICATES THAT THE FORBIDDEN BAND OF HEXAGONAL SE HAS A MORE COMPLICATED STRUCTURE WITH A CONTINUOUS SPECTRUM OF THE LOCAL LEVEL DISTRIBUTION. THERE CAN EXIST INTERVALS WITH AN ELEVATED D. OF LEVELS IN THIS SPECTRUM; SUCH INTERVALS APPEAR IN THE MEASUREMENT OF THE THERMOSTIMULATED COND. THE ACTIVATION ENERGY, 0.25 EV, CORRESPONDS TO THE DARK COND. THE TEMP. DEPENDENCE MEASURED AFTER A CYCLE OF ILLUMINATION AT 83DEGREEK, QUICK HEATING, AND SLOW COOLING, GAVE ACTIVATION ENERGIES OF 0.075, 0.090, AND 0.13 EV IN 3 CONSECUTIVE CYCLES.

FACILITY: L'VOV. TORG.-EKON. INST., LVOV, USSR.

UNCLASSIFIED

1/2 008 UNCLASSIFIED PROCESSING DATE--23OCT70
TITLE--NATURE OF DELTA TRIURANIUM OXTOXIDE -U-
AUTHOR-(02)-TSYIGUNOV, A.N., KOVBA, L.M.
COUNTRY OF INFO--USSR
SOURCE--VESTN. MOSK, UNOV., KHIM. 1970, 11(1), 59-61
DATE PUBLISHED-----70
SUBJECT AREAS--CHEMISTRY
TOPIC TAGS--URANIUM OXIDE, METAL OXIDE
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1997/1471 STEP NO--UR/0189/70/011/001/0059/0061
CIRC ACCESSION NO--AP0120258
UNCLASSIFIED

2/2 008

UNCLASSIFIED

PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0120258

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ANAL. OF PREVIOUSLY PUBLISHED DATA ON DELTA U SUB3 O SUB8 AND BETA U SUB3 O SUB8 PHASES SHOWS THAT DELGA U SUB3 O SUB8 IS NOT A NEW MODIFICATION OF U OXIDE (U SUB3 O SUB8), BUT IS A MIXT. OF PHASES OF ALPHA U SUB3 O SUB8 IN INSIGNIFICANT AMTS. AND BETA U SUB3 O SUB8 AS THE BASIC PHASE.

UNCLASSIFIED

1/2 022 UNCLASSIFIED PROCESSING DATE--04DEC70
TITLE--METHOD FOR DETERMINING VIRIAL COEFFICIENTS OF THE EQUATION OF STATE
ACCORDING TO P-V-T DATA USING RESULTS OF MACHINE EXPERIMENTS -U-
AUTHOR--TSYKALO, A.L.
COUNTRY OF INFO--USSR
SOURCE--ZH. FIZ. KHIM. 1970. 44(5), 1315-16
DATE PUBLISHED-----70
SUBJECT AREAS--MATHEMATICAL SCIENCES
TOPIC TAGS--EQUATION OF STATE, ARGON, MATHEMATIC MODEL
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--3008/1036 STEP NO--UR/0076/70/044/005/1315/1316
CIRC ACCESSION NO--AP0138059
UNCLASSIFIED

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UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0138059

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE VIRIAL COEFFS. CAN BE DETD. BY USING THE RESULTS OF MACHINE MODELLING AND EXPTL. DATA. THE ISOTHERMS ARE DESCRIBED IN A DEFINED RANGE OF DS. WITH A HIGH ACCURACY OF CALCN. THE METHOD IS ILLUSTRATED BY DETG. THE 3RD AND 4TH VIRIAL COEFFS. OF AR. FACILITY: ODESS. TEKHNOL. INST. PISHCH. KHOLOD. PROM., ODESSA, USSR.

UNCLASSIFIED

USSR

Materials UDC 621,039.5

VOTINOV, S. N., LOSEV, N. P., PROKHOROV, V. I., SAMSONOV, B. V., TSYKANOV, V. A.,
FIN'KO, A. G., Melekess

"Estimate of Long Term Strength of Structural Materials in Reactor"

Kiev, Problemy Prochnosti, No 5, May, 1971, pp 61-64.

Abstract: Results are presented, produced in testing of tubular specimens of a number of structural materials under conditions of bombardment in a nuclear reactor. Two hundred hour tests performed with a flux of $2.5 \cdot 10^{12} \text{ cm}^{-2} \cdot \text{sec}^{-1}$ fast neutrons and $6 \cdot 10^{13} \text{ cm}^{-2} \cdot \text{sec}^{-1}$ thermal neutrons showed that the time to rupture for tubing of steels Types OKh16N15M3B, OKh16N15M5BR and Kh18N10T at 650°C decreases in comparison to the time to rupture without bombardment by not over 3-10 times. The deformation at rupture is approximately 1.5 times less than for specimens not bombarded. No changes in durability or ductility of copper and copper with chromium were observed in the reactor at 700°C .

USSR

UDC: 539.125.5.04

NEVEROV, V.A. and TSYKANOV, V.A.

"Results of Complex Investigation of Heat Release in SM-2 Reactor"

Tashkent, Sb. Dozimetriya i Radiats. Protsessy v Dozimetr. Sistemakh
(Symposium on Dosimetry and Radiation Processes in Dosimetric Systems),
1972, pp 200-206 (from Referativnyy Zhurnal-Yadernyye Reaktory, 1973,
Abstract No 3.50.80)

Translation: Basic values of energy release were measured on experimental devices with active nuclear reactor for a specific set of materials (along thickness and height) and a given configuration. Results of these measurements obtained by computer are presented. Contribution of neutron component to the energy release of a number of construction materials subject to radiation was determined. 1 illustration. 1 table. 1 reference.

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UDC 621.039.532.5:621.039.553

CHECHETKINA, Z. I., COL'TSEV, V. P., KLIMENKOV, V. I., VOTINOV,
S. N., and TSYKANOV, V. A.

"Behavior of Metallic Beryllium in the SM-2 Reactor"

Moscow, Atomnaya Energiya, Vol 29, No 3, Sep 70, pp 174-177

Abstract: Metallic beryllium has been used in the SM-2 reactor since 1962 in the system for expelling water from the neutron trap. The expulsion system consists of four inserts placed between the fuel assemblies and the central channel located in the neutron trap. Each insert consists of two blocks. The bottom part of the safety rods is also made of beryllium. In 1964 the reactor design was modified by replacing the beryllium oxide reflector with metallic beryllium. Since then experimental material has been accumulated on the stability of metallic beryllium under SM-2 conditions. The article presents some of the data. Experiments were conducted on specimens cut out of the inserts and safety rods before and after being held in the reactor. The inserts were made of hot-pressed blocks of dis-

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CHECHETKINA, Z. I., et al., Atomnaya Energiya, Vol 29, No 3, Sep 70, pp 174-177

tilled powder beryllium, the safety rods fabricated by hot extrusion from hot-pressed blocks. The investigated parts found in the neutron trap underwent the maximum irradiation. The thermal-neutron flux over the cross section of the inserts was $1.5 \cdot 10^{15}$ - $5 \cdot 10^{14}$ nv, the fast-neutron flux $1 \cdot 10^{15}$ nv and energy release through gamma absorption 100 w/g. The main emphasis was on dimensional stability, density, structural changes, and mechanical properties of beryllium.

It was found that the surface condition depends on the water quality, the total time spent in the water by the beryllium, and the integral irradiation dose. A photograph taken of the inserts during the 1962-1964 period shows extensive pitting regions, while a photograph taken subsequently, when the quality of the medium was improved, shows only individual traces of pitting. An increase in the irradiation dose on the surface of the

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Sep 70, pp 174-177

blocks produces macrocracks in addition to the pitting. No changes were found in the geometric dimensions of the investigated parts even after irradiation with fast neutrons to an integral dose of $(3-4) \cdot 10^{22}$ neutrons/sq cm. The density of the beryllium remained constant in all cases up to doses of $(5-7) \cdot 10^{21}$ neutrons/sq cm. A decrease in density to 1.5 percent was found in individual specimens cut out of blocks irradiated with doses of 10^{22} neutrons/sq cm or more. There is practically no change in the density of hot-extruded beryllium at the above doses. Up to $5 \cdot 10^{21}$ neutrons/sq cm there is no appreciable change in the microstructure of not-pressed beryllium. At an integrated flux of about 10^{22} neutrons/sq cm there are twins, slip lines, microcracks, and appreciable discrete porosity, primarily along the grain boundaries. Higher doses result in fur-

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CHECHETKINA, Z. I., et al., Atomnaya Energiya, Vol 29, No 3, Sep 70, pp 174-177

ther porosity development and the spread of microcracks over the grain boundaries, as well as the grains themselves. No appreciable changes are found in the microstructure of hot-extruded beryllium irradiated with an integrated flux of up to $1.5 \cdot 10^{22}$ neutrons/sq cm; there are no microcracks. There is a sharp increase in microhardness up to an integrated flux of $(3-5) \cdot 10^{21}$ neutrons/sq cm. The compression strength remains practically unchanged up to a dose of $(3-5) \cdot 10^{21}$ neutrons/sq cm, but declines with a higher dose. Yield point is unchanged up to 10^{20} neutrons/sq cm, but rises with a higher dose. The influence of the build-up of helium and tritium products is considered.

The results indicate that the permissible irradiation dose for beryllium parts which carry no external mechanical loads is an integrated fast-neutron flux of $2 \cdot 10^{22}$ neutrons/sq cm.

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172 020
UNCLASSIFIED
TITLE--SEPARATION OF ARSENIC FROM NIOBIUM AND TANTALUM -U- PROCESSING DATE--30OCT70
AUTHOR--TSYKHANSKIY, V.D.
COUNTRY OF INFO--USSR
SOURCE--UKR. KHIM. ZH. 1970, 36(1), 91-2
DATE PUBLISHED-----70
SUBJECT AREAS--MATERIALS, CHEMISTRY
TOPIC TAGS--ARSENIC, NIOBIUM, TANTALUM, METAL CHEMICAL ANALYSIS
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1996/1997
CIRC ACCESSION NO--AP0118956
STEP NO--UR/0073/70/036/001/0091/0092
UNCLASSIFIED

272 020
 CIRC ACCESSION NO--AP0118956 UNCLASSIFIED PROCESSING DATE--30OCT70
 ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. MIX 50-500 MG OF A SAMPLE CONTG.
 AS, AB, AND TA WITH 3 TIMES AS MUCH OF A 1:1 NA SUB2 CO SUB3 -KMNO SUB4
 MIXT. COVER WITH TWICE AS MUCH OF THE NA SUB2 NEGATIVE CO SUB3 -KMNO
 SUB4 MIXT. PLACE IN A COLD MUFFLE AND RAISE THE TEMP. TO 700DEGREES.
 AFTER 30 MIN EXT. THE RESIDUE WITH 30-40 ML HOT H SUB2 O, FILTER, AND
 WASH THE INSOL. RESIDUE WITH 20 ML HOT H SUB2 O. THE AS WILL BE IN
 SOLN. AND CAN BE DETD. AS DESIRED. IN ANALYZING NB PHENYLARSONATE-TA
 PHENYLARSONATE MIXTS. A TITRIMETRIC CR SUB2 O SUB7 PRIME NEGATIVE
 NEGATIVE METHOD WAS USED AFTER LIBERATING AS FROM SOLN. WITH NAH SUB2 PO
 SUB2. FACILITY: INST. IBSHCH. NEORG. KHIM. KIEV. USSR.

UNCLASSIFIED

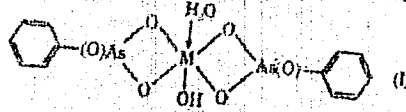
Acc. No.

AP0048936

Abstracting Service:
CHEMICAL ABST. 5/70

Ref. Code:
4A0075

104501s Reaction of niobium and tantalum with phenylarsonic acid. Tsykhanskiy, V. D.; Nazarenko, V. A.; Shergina, N. I.; Koniugova, V. V. (Inst. Geochem. Analysis, USSR). Zh. Anal. Khim. 1970, 25(1), 97-102 (Russ). When Nb and Ta phenylarsonates are formed under conditions eliminating the hydrolysis of the metal ions, the ppt. has a compn. corresponding to the formula I. In practice, when the pptn. is carried out by heating the solns. the ppts. are contaminated with hydrolysis products, esp. when the concns. of the substances eliminating the hydrolysis are insufficient. The coordinating Nb and Ta ions in their phenylarsonates are the 4 charged $M(OH)_4^{4+}$ cations and the coordinated ions are the doubly charged anions of phenyl-



arsonic acid. The soly. products for Nb and Ta phenylarsonates are 8.02×10^{-6} and 7.54×10^{-6} , resp. (ionic strength = 1.0, Chain Weiner).

REEL/FRAME
19800708

7 nt

USSR

UDO 621.375.121

TSYKIN, G.S., RYNDA, A.N. [Members Scientific-Technical Society Of Radio Engineering, Electronics, And Communications imeni A.S. Popov]

"Calculation Of Stages Of An Amplifier Of Harmonic And Pulse Signals With Emitter High-Frequency Correction"

Radiotekhnika, Vol 27, No 5, May 1972, pp 94-100

Abstract: A method is described for the engineering calculation of wide band transistorized amplifier stages of amplifiers of both harmonic and pulse signals. A circuit for high-frequency correction of series complex current feedback (circuit of emitter high-frequency correction) is examined. Computed formulas and graphics are presented as well as examples of calculations. An experimental study of a number of stages of an amplifier of both harmonic and pulse signals, assembled on the basis of transistors with carefully measured parameters, showed very good agreement between the data calculated by the methods described in the paper and the experimental data. The deviation of the calculated and experimental data lies in the limits of precision of the measurements and ordinarily does not exceed 2-3 percent. 5 fig. 3 ref. Received, 22 Nov 1971.

1/1

1/2 009 UNCLASSIFIED PROCESSING DATE--11SEP70
TITLE--REDUCTION AND SLAG FORMATION IN BLAST FURNACE PROCESS -U-
AUTHOR--TSYLEV, L.M.
COUNTRY OF INFO--USSR
SOURCE--REDUCTION AND SLAG FORMATION IN BLAST FURNACE PROCESS
(VOSSTANOVLENIYE I SHLAGOBRIZOVANIYE V DOMENNOM PROTSESSE) MOSCOW,
DATE PUBLISHED-----70
SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR
TOPIC TAGS--BLAST FURNACE, CAST IRON, IRON ORE, METALLURGIC SLAG, METAL
REDUCTION, PETROGRAPHY
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1986/1991 STEP NO--UR/0000/70/000/000/0001/0155
CIRC ACCESSION NO--AM0103694
UNCLASSIFIED

2/2 009

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AM0103694

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. TABLE OF CONTENTS: PREFACE 7.
 CHAPTER I EFFECT OF STRUCTURE OF DRE, SINTERS AND DRE FUEL MATERIALS ON
 REDUCTION PROCESS OF IRON AND ITS OXIDES 9. II REDUCTION OF IRON
 FROM COMPLEX CHEMICAL COMPOUNDS. 27. III SOFTENING OF IRON ORES AND
 SINTERS 31. IV SLAG FORMATION IN BLAST FURNACES 44. V SLAG
 FORMATION DURING MELTING OF FERROSILICON AND OPEN HEARTH CAST IRON 56.
 VI PHASE DIAGRAMS AND FUSIBILITY CURVES 72. VII PHASE CHANGES IN
 PROCESS OF SLAG FORMATION. STABLE SLAGS 87. VIII VISCOSITY OF SLAG
 MELTS: 97. IX MECHANISM OF VISCOSITY OF SLAG MELTS AND THEIR
 STRUCTURE 144. LITERATURE 153. IN THE MONOGRAPH WERE ANALYZED AND
 CORRELATED DATA OF DOMESTIC AND FOREIGN INVESTIGATIONS OF SLAG
 FORMATION, REDUCTION AND PHYSICAL PROPERTIES OF SLAG MELTS IN THE BLAST
 FURNACE PROCESS. PROCESSES OF REDUCTION OF IRON, MANGANESE AND OTHER
 ELEMENTS FROM THEIR COMPOUNDS AND PROCESSES OF SOFTENING ORES AND
 SINTERS WERE EXAMINED. QUESTIONS WERE ILLUMINATED OF SLAG FORMATION AND
 STRUCTURE OF SLAGS FROM THE POSITION OF IONIC THEORY. THE AUTHOR WIDELY
 USED TECHNICAL PETROGRAPHY FOR STUDYING PROCESSES OF FORMATION OF
 MINERAL PHASES. ETC. THE PUBLICATION WAS INTENDED FOR RESEARCHERS AND
 PRACTICAL WORKERS, WORKING IN RESEARCH INSTITUTES AND IN INDUSTRIAL
 CONCERNS OF FERROUS METALLURGY.

UNCLASSIFIED

Powder Metallurgy

USSR

UDC: 669.243.73-492

TSYLOV, B. A., KORNEV, A. V., and IVLEV, V. S.

"Investigating the Process of Obtaining Light Powders by the Thermal Breakdown of Carbonyl Nickel"

Moscow, Tsvetnyye Metally, No 8, Aug 70, pp 26-27

Abstract: A study was made of the process of obtaining light powders by the thermal breakdown of carbonyl nickel. The purpose of the investigation was to determine the optimal starting conditions for the equipment and to study the interrelationship of the parameters in the starting and operating periods of the process. The possibility of intensifying the process without additional heating of the pulverizing equipment was also looked into. The operations involved in the investigation were done with equipment consisting of a pulverizer, a vaporizer, and a thermal-exchange device. These were parallel operations, each being carried out on individual sets of this equipment and under the following conditions: the temperature of the heated gas was held constant and the pressure in the equipment kept within

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USSR

TSYLOV, B. A., et al., Tsvetnyye Metally, No 8, Aug 70, pp 26-27

150-170 mm (water column); tests of the powder were taken hourly from each of the systems; with a bulk-weight increase of more than 0.5 g/cm^3 , the productivity of the equipment was lowered by reducing the vaporizing rate of the carbonyl nickel, as a result of which the temperature of the pulverizer's upper zone increased with a drop in the powder's bulk weight; with a reduction in the bulk weight below 0.3 g/cm^3 , the same action occurred in reverse order. After completion of the operations, the equipment was opened and the roofs of the four pulverizers were found to be overgrown with deposits of nickel powder to various extents, depending on the operation period, which differed for each system. A photograph of the deposits on the inner roof of one of the pulverizers is shown.

2/2

Information Theory

USSR

UDC 621.395.44:621.376.56--621.315.213.029.55

KASHUTIN, A. A., TSYM, A. YU.

"Investigating Long-Distance Symmetrical Cable in PCM System Frequency Ranges"
Moscow, Elektrosvyaz', No 8, 1970, pp 16-21

Abstract: The cable under investigation in this article is assemblyline manufactured with cordel polystyrene insulated wires in an aluminum sheath of the MKSAP-60 4X4X1.2 type, making up sections of two and three kilometers in length. Tests were made of the transmission parameters and cross-talk characteristics in a frequency range up to 8 MHz in a pulse-code modulation system with a transmission speed of 8 Mbauds or 120 telephone channels, and up to 15 MHz with a speed of 15 Mbauds or 240 channels. The authors conclude that the cable satisfies shielding requirements, that the variations in the discrete shielding values of the cable circuits at the far end correspond to the normal Gauss-Laplace distribution, and that the reduction in the average value of cross-talk shielding does not exceed 1.45 nepers in the frequency range to 8 MHz or 1.75 nepers in the range to 15 MHz. A description of the test methods is given together with plots of various cable characteristics.

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USSR

LAMBIN, L. N., ~~TSYMBAL, G. Ya.~~

UDC: 8.74

"Synthesis of Algorithms for a Simple and Sequential Static Structure"

Vychisl. tekhn. v mashinostr. Nauch.-tekhn. sb. (Computer Technology in Machine Building. Scientific and Technical Collection), 1970, Dec, pp 31-35 (from RZh-Kibernetika, No 8, Aug 72, Abstract No 8V638)

Translation: A method is described for cutting the "excess" lines out of a table of information in algorithm synthesis. Methods are given for synthesizing algorithms of simple and sequential static structure. Authors' resumé.

USSR

LAMBIN, L. N., TSYMBAL, G. Ya.

"Synthesis of Structures of Algorithms for an Ordered Information Table"

Vychisl. Tekhn. v Mashinostr. Nauch.-tekhn. sb [Computer Technology and Machine Building, Scientific and Technical Collection], June, 1970, pp 55-65, (Translated from Referativnyy Zhurnal, Kibernetika, No 3, 1972, Abstract No 3 V530 by the author's).

Translation: A description is presented of an algorithm for construction of an ordered information table. The basic versions of synthesis of the structure of the algorithm for calculation of a fixed set of finite goals is studied.

USSR

GORELIK, A. G., LAMBIN, L. N., TSYMBAL, G. Ya.

"System for Timely Change in Structure of Algorithms"

Vuchisl. Tekhn. v Mashinostr. Nauch.-tekhn. sb. [Computer Engineering in Machine Building, Scientific and Technical Collection], June, 1970, pp 41-54, (Translated from Referativnyy Zhurnal, Kibernetika, No 2, 1972, Abstract No 2 V700 by the author's).

Translation: A functional description is presented of the system. The interrelationship of man with machine is studied on the example of the solution of practical problems. A foundation is presented for a method of ordering the information in a description of a model of an object.

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USSR

UDC 619:616.9-022.6+636.1+636.2+636.4+636.52/58

TSYMBAL, V. I.; OLIYNIK, M. K.

"Interdependence of Titers of Various Antibodies from Cattle
Convalescing from Foot-and-Mouth Disease Produced by Virus
Variant A22"

Kiev, V sb. Veterinariya (Veterinary Science -- Collection of
Works / Ukrainian 7), "Urozhay," No 26, 1970, pp 21-28 (from
RZh-58. Zhivotnovodstvo i Veterinariya, No 4, Apr 71, Abstract
No 4.58.577)

Translation: Serum samples taken 2 to 375 days after foot-and-
mouth disease from 85 animals, 1-14 years of age, were studied.
A direct interdependence was found between the height of the
neutralization index (NI) and titers of precipitating antibodies
(PA) and antibodies inhibiting complement fixation. This inter-
dependence is particularly pronounced 120-180 days after the
animals have had foot-and-mouth disease. When the mean NI of a
serum mixture was $10^{3.4}$, the PA titer was > 1.0 , and it was
equal to 1.0 when NI = $10^{2.4}$. The mean NI of a serum mixture

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USSR

TSYMBAL, V. I., et.al, V sb. Veterinariya, "Urozhay," No 26, 1970, pp 21-28

with an antibody titer inhibiting complement fixation of $> 1:20$ was equal to $10.3.07$, and with a titer of $> 1:20$ NI, $10^{2.4}$ to $10^{2.6}$. The absence of PA and of antibodies inhibiting conglutination in remote periods after illness did not indicate the absence of an immunity; rather, in these periods virus-neutralizing antibodies were detected in the sera and a high resistance to foot-and-mouth disease virus variant A₂₂ in infected animals was noted for 8-12 months after convalescence.

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USSR

UDC: 681.325.65:621.387

TSYMBAL, V. P.

"Digital Equipment Based on Logic Thyratrons"

Ustroystva Diskretnoy Tekhniki Na Logicheskikh Tiratronakh [English Version Above], Kiev, Tekhnika Press, 1969, 130 pp (Translated from Referativnyy Zhurnal Avtomatika, Telemekhanika i Vychislitel'naya Tekhnika, No 7, 1970, Abstract No 7A47K, by T. R.)

Translation: The physical properties of the operation and operating principle of new TKH6G-TKH9G glow discharge thyratrons are presented, along with the design of typical circuits using these thyratrons, allowing logic operations to be performed. Examples of operating circuits based on these devices are presented. The general principles of the design of contactless logic circuits are outlined and solutions of characteristic engineering problems from the area of automation, telemechanics, and computer technology are given. Circuit realizations of the maximum set of elementary boolean functions are presented for the first time and engineering methods of synthesis using these thyratrons are outlined. 60 illustrations; 9 tables; 27 biblio. refs.

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- 25 -

USSR

UDC: 51:621:391

Tsybhal, V. P.

"The Theory of Information and Coding. Part I. Information Theory"

Teoriya Informatsii i Kodirovaniya. Ch. I. Teoriya Informatsii [English version above], Kiev Institute of Economics, 1972, 164 pages (Translated from Referativnyy Zhurnal Kibernetika, No 11, 1972, Abstract No 11V380K, from the foreword)

Translation: The first part of a textbook on information theory and coding theory, designed for economics majors. The book discusses the following main problems: problems of information theory, communications channels, quantitative estimation of information, entropy and its properties, conditional entropy, redundancy, information transmission rates, the basic theorem of coding for communications channels without noise, interference stability, effectiveness and reliability of information transmission systems, calculation of the quantity of information during transmission of messages through a discrete channel with noise, the theory of C. Shannon on coding in the presence of noise, the throughput capacity of a discrete communication channel with noise.

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USSR

TSYMBAL, V. P.

UDC 51:621.391

"Information and Coding Theory. Part 1. Information Theory"

Teoriya informatsii i kodirovaniya. Ch. 1. Teoriya informatsii (cf. English above), Kiev, Kiev Institute of the Economy, 1972, 164 pp, ill., 52 kop. (from RZh-Matematika, No 11, Nov 72, Abstract No 11V380 K)

Translation: The first part of this text on information theory and coding theory is intended for students of an economics VUZ. The following basic problems are presented in sequence in the text: problems of information theory, communications channels, quantitative evaluation of information, entropy and its properties, conditional entropy, surplus, rate of information transfer, the basic theorem of coding for communication channels without noises, the quality of being interference-free, efficiency and reliability of information transfer systems, calculation of a quantity of information in the transmission of communications over a discrete channel with noises, Shannon's theorems on coding in the presence of noises, and the transmission capacity of discrete communication channels with noises. From the author's foreword.

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USSR

KCSHELEV, V.S., TSYMBALOV, G.V.

UDC 621.385.7.032.213.6

"Theory Of Computation Of The Thermal Regime Of A TWT Cathode Unit"

Elektron. tekhnika. Nauchno-tekhn. sb. Tekhnol. i organiz. proiz-va (Electronic Technology. Scientific-Technical Collection. Technology And Organization Of Production), 1970, No 2(34), pp 119-129 (from RZh--Elektronika i yeye primeneniye, No 12, December 1970, Abstract No 12A98)

Translation: A system of equations is presented which is the basis of an exhaustive analysis of the thermal regime of a traveling-wave tube heater-cathode unit. These relations make it possible to give a quantitative evaluation of the effect of various parameters of the cathode unit on the temperature of the cathode and heater, and the filament current, as well as making it possible to develop more effective methods for reduction of the heater temperature with a simultaneous regulation of the cathode temperature. The following results were obtained from computations of the basic magnitudes which determine the thermal regime of a TWT heating-cathode unit: temperature of cathode 833°C ; maximum temperature of base, 1513°C ; average temperature of base, 1456°C ; maximum temperature of alumina surface, 1503°C ; temperature drop by alumina coating, 10°C ; temperature of lower shield of cathode frame, 416°C ; heat flux through cross section of base at the site of the exit of the heater from the cathode, 1 watt;

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KOSHELEV, V.S., et al, Elektron. tekhnika. Nauchno-tekhn. sb. Tekhnol. i organiz. proiz-va, 1970, No 2(34), pp 119-129

heat flux from cathode through ceramic sleeves, 1.0779 watt; heat flux by radiation from oxide coating, 3.259 watt; over-all power of filament, 8.82 watt; efficiency of TWT cathode unit, 36.94 percent; thermal losses from cathode because of thermal conductivity, 34.88 percent; because of radiation, 27.06 percent; thermal losses from heater resulting from thermal conductivity, 1.13 percent. 4 ill. 2 ref. G.B.

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Metrology, Mapping, Graphics

USSR

UDC 538.22.082.7

KHINEV, N. I., KULINICH, A. G., TSYNKUSH, P. V.

"Electroluminescent Method of Measurement of Magnetostriction"

Moscow, Zavodskaya Laboratoriya, No 12, 1972, pp 1492-1494.

Abstract: A method is suggested for measurement of the magnetostriction of ferromagnetic materials in a dynamic mode using electroluminescent sensors. The sensitivity of an installation operating on this principle is no less than existing tensometric and mechanical-optical devices.

UNCLASSIFIED

TITLE--EFFECT OF THE NATURE OF THE ELECTRODE METAL ON THE SEPARATION
 FACTOR FOR HYDROGEN ISOTOPES -U-

AUTHOR--(02)-TSYONSKIY, V.M., KRISHTALIK, L.I.

PROCESSING DATE--16OCT70

COUNTRY OF INFO--USSR

SOURCE--ELEKTROKHIIMIYA 1970, 6(2), 265-8

DATE PUBLISHED-----70

SUBJECT AREAS--NUCLEAR SCIENCE AND TECHNOLOGY

TOPIC TAGS--ELECTRODE DESIGN, ISOTOPE SEPARATION, WAVE FUNCTION,
 TRANSITION PROBABILITY, CHARGE DENSITY, ELECTRODE POTENTIAL, HYDROGEN
 ELECTRODE, HYDROGEN ION, HYDROGEN DEUTERIUM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1983/1716

CIRC ACCESSION NO--AP0054558

STEP NO--UR/0364/70/006/002/0265/0268

UNCLASSIFIED

2/2 030

CIRC ACCESSION NO--AP0054558
ABSTRACT/EXTRACT--(U) GP-0-

UNCLASSIFIED

PROCESSING DATE--16OCT70

ABSTRACT. THE DEPENDENCE OF THE ISOTOPE SEPN. FACTOR, S , OF H ON THE NATURE OF THE METAL WAS STUDIED. BASED ON A REPORT BY J. HORIUTI AND M. POLANYI (1935), THE DECREASE IN S WITH INCREASING CHARGE EXCHANGE IS ATTRIBUTED TO THE DECREASE IN THE POTENTIAL BARRIER AND THUS TO AN INCREASE IN THE TUNNELLING PROBABILITY OF THE H ION. THE TRANSITION PROBABILITY INCREASES WITH THE DEGREE OF OVERLAPPING OF THE WAVE FUNCTIONS OF THE PROTON REFERRING TO THE STATES OF THE ADSORBED H AND THE HYDROXONIUM ION. THIS TRANSFER PROBABILITY DEPENDS ON THE MASS OF THE H ION AND ON THE DISTANCE OF THE PROTON TRANSFER. THE CHANGE OF S WITH THE POTENTIAL CAN BE ATTRIBUTED TO THE POTENTIAL INCREASE; THE FORCE BY WHICH THE HYDROXONIUM ION IS ATTRACTED TO THE SURFACE INCREASES, THIS DECREASING THE DISTANCE OF THE PROTON TRANSFER AND INCREASING THE OVERLAPPING OF THE WAVE FUNCTIONS. THE CURVES OF $S(\eta)$, WHERE η IS SURFACE CHARGE, SHOULD APPROACH THE CURVES $S(\eta H)$, WHERE ηH IS THE H OVERVOLTAGE, WHICH IS OBSD. IN EXPT. TOTAL COINCIDENCE DOES NOT TAKE PLACE, HOWEVER, SINCE S SHOULD INCREASE WITH BOND ENERGY OF H AND M, E_{SUBM-H} , OWING TO A DECREASE IN THE PROBABILITY OF PROTON TRANSFER. AT A GIVEN η , S DECREASES IN THE SERIES GA, HG, PB, AMALGAM TL, I.E. IN THE SERIES IN WHICH E_{SUBM-H} DECREASES.

FACILITY: INST. ELEKTROKHM., MOSCOW, USSR.

UNCLASSIFIED

USSR

UDC 669.13.131.2

KONTOROVICH, I. Ye. (deceased), ROZHKOVA, Ye. V., GARBER, M. Ye., and TSYPIN, I. I., All-Union Scientific Research, Planning, and Technological Institute of Coal Industry

"On the Optimum Content of Carbon and Chromium in Wear-Resistant White Irons"
Moscow, Metallovedeniye, No 5, 1971, pp 45-46

Abstract: Effects of carbon (1.5-4.0%) and chromium (12.0-30.0%) on the wear resistance and strength of white irons are investigated and the results discussed. The wear resistance and strength of white irons are more affected by carbon than by chromium. White irons with a carbon content somewhat higher than the eutectic show the highest wear resistance, but their use is limited due to insufficient strength properties. These irons can be recommended for working under wear conditions without notable impact loadings. For parts of machines operating under conditions where a strength of $\sim 90 \text{ kg/mm}^2$ is required, white irons with a carbon content of no more than 2.8% and 12-18% Cr should be used. Three figures, five bibliographic references.

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UNCLASSIFIED

019

TITLE--SELECTION OF THE COMPOSITION AND STRUCTURE OF WEAR RESISTANT WHITE
 CAST IRON CASTINGS -U-
 AUTHOR-(02)-GARBER, M.YE., TSYBIN, I.I.

PROCESSING DATE--30OCT70

COUNTRY OF INFO--USSR

SOURCE--LITEINOE PROIZVOD. 1970, 2, 2-6

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CAST IRON, WEAR RESISTANT FERROUS ALLOY, EUTECTIC, CARBIDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1742

CIRC ACCESSION NO--AP0118720

STEP NO--UR/0128/70/002/000/0002/0006

UNCLASSIFIED

2/2 019

CIRC ACCESSION NO--A0118720
ABSTRACT/EXTRACT--(U) GP-0-

UNCLASSIFIED

PROCESSING DATE--30OCT70

ABSTRACT. THE TYPE AND HARDNESS OF CARBIDES WAS VARIED BY ALLOYING THE BASIC CAST IRON (CONTG. 3PERCENT C AND 1.5PERCENT MO) WITH 1.26-31.1 WT. PERCENT CR; THE AMT. OF CARBIDES VARIED BY CHANGING THE CONC. OF C (1.53-4.2PERCENT), IN THE CAST IRON CONTG. 12PERCENT CR AND 1.5PERCENT MO, AND THE SIZE OF THE CARBIDE PARTICLES WAS VARIED BY CHANGING THE COOLING RATE DURING THE CRYSTN. OF FLAT CASTINGS (10-100 MM THICK) IN SAND AND METALLIC MOLDS. ALL SPECIMENS WERE POLISHED AND THE MICROHARDNESS WAS USED AS AN INDICATOR OF WEAR RESISTANCE. WITH INCREASING CARBIDE HARDNESS THE WEAR RESISTANCE INCREASED AND REACHED MAX. AT 12-24PERCENT CR WHEN THE CARBIDE TYPE WAS M SUB7 C SUB3. THE WEAR RESISTANCE OF CAST IRON WITH 29PERCENT CR DECREASED OWING TO THE PRESENCE OF COARSE AND BRITTLE NEEDLES OF TRANSEUTECTOIDAL CARBIDES. WITH AN INCREASING AMT. OF CARBIDE (C CONC. INCREASED TO 3.25PERCENT) THE WEAR RESISTANCE OF CAST IRON CONTG. 12-14PERCENT CR INCREASED LINEARLY. A FURTHER INCREASE OF C CONC. RESULTED IN THE APPEARANCE OF TRANSEUTECTOIDAL CARBIDES M SUB3 C, WHICH WERE LESS STABLE. INCREASING THE SIZE OF CARBIDE PARTICLES DECREASED THE WEAR RESISTANCE. FROM THE POINT OF WEAR RESISTANCE, THE OPTIMUM CR CONC. IN CAST IRON IS 12-18PERCENT AND C CONC. SHOULD BE SLIGHTLY BELOW EUTECTIC CONC. I.E. AT CR 12PERCENT, C 3.5-3.6PERCENT AND LOWER AT HIGHER CR CONCNS. THE USE OF METALLIC MOLDS SHARPLY INCREASED THE WEAR RESISTANCE OF CASTINGS WITH THICK WALLS (GREATER THAN 50 MM), AS COMPARED TO SAND MOLDS.

UNCLASSIFIED

020

UNCLASSIFIED

PROCESSING DATE--09OCT70

TITLE--WEAR RESISTANT GRINDING COMPONENTS OF CENTER RUN COAL GRINDING MILLS -U-

AUTHOR--(05)--~~TSYPIN, I.U.~~, TRUBITSYN, N.A., KRYUCHKOV, P.P., TIMOFEYEV, V.L., ZOLOCHEVSKIY, G.L.

COUNTRY OF INFO--USSR

SOURCE--LITEINOE PROIZVOD. 1970, 2, 11-13

DATE PUBLISHED--70

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR

TOPIC TAGS--COAL, GRINDING MACHINE, WEAR RESISTANT FERROUS METAL, ALLOY DESIGNATION, HARD ALLOY, CAST IRON, ALLOY COMPOSITION, CHROMIUM CONTAINING ALLOY, MANGANESE CONTAINING ALLOY, MO YB DENIUM CONTAINING ALLOY/(U)N HARD CAST IRON, (U)300KH13G3M CHROMIUM MANGANESE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRA--1995/1378

CIRC ACCESSION NO--AP0116827

STEP NU--UR/0128/70/002/000/0011/0013

UNCLASSIFIED

2/2 020
 CIRC ACCESSION NO--AP0116827 UNCLASSIFIED PROCESSING DATE--09OCT70
 ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE FOLLOWING CAST IRONS WERE
 TESTED: NIKHARD, 300KH13G3M, AND CHILLED IRON WITH GLOBULAR GRAPHITE.
 THE BEST WEAR RESISTANCE WAS SHOWN BY THE NIKHARD AND 300KH13G3M; CHEM.
 COMPS. OF THESE ALLOYS AS USED EXPTLY. AT 4 INDUSTRIAL COAL GRINDING
 MILLS ARE GIVEN AS FOLLOWS: (SHOWN ON MICROFICHE). THE WEAR RESISTANCE
 AFTER 3500 HR OF WORK OF 300KH13G3M WAS A FACTOR OF 1.6 HIGHER THAN THAT
 OF THE NIKHARD CAST IRON. A DECARBURIZED LAYER ON THE SURFACE OF
 300KH13G3M (DUE TO AIR HARDENING) INITIALLY DECREASED THE WEAR
 RESISTANCE.

UNCLASSIFIED

USSR

UDC 669.3:539.214:539.377

LAYHER, D. I., TSYPIN, M. I., NOVIKOV, A. V., SHEVAKIN, Yu. F., SOLLER-TINSKAYA, Ye. S., AFONIN, M. P., State Scientific Research and Design Institute of Alloys and Nonferrous Metalworking, Moscow

"Ductility, Brittleness and Superplasticity of Copper"

Moscow, Doklady Akademii Nauk SSSR, Vol 209, No 1, Mar/Apr 73, pp 80-82

Abstract: The authors investigate the particulars of behavior of specimens cut from copper ingots and deformed by tension over a broad temperature range (from -196 to 1000°C, tests at 100°C and higher being done in vacuum) at strain rates from 10^{-5} to 10^{-2} s⁻¹. The deformation curves were processed on the "Minsk-32" digital computer. The results show the existence of two fundamentally different mechanisms of high-temperature plastic deformation of copper, in one of which superplasticity is observed due to periodic recrystallization of the metal at the focus of deformations. The existence of such a mechanism of superplasticity may be considered proved, at least for pure metals.

1/1

USSR

BOLYATKO, V. V., LIPENOV, A. D., MASHKOVICH, V. P., SEVOROV, A. P., PIN, S. G. UDC: 53.07/.08+53.001.5

"Attenuation of Soft-Spectrum Neutrons in Continuous Shields"

V sb. Vopr. dozimetrii i zashchity ot izluch. (Problems of Dosimetry and Radiation Shielding--collection of works), vyp. 12, Moscow, Atomizdat, 1971, pp 142-146 (from REN-Fizika, No 4, Apr 72, Abstract No 44727)

Translation: Soft-spectrum neutron propagation is studied in serpentine ore on an experimental installation -- an intermediate neutron converter. Serpentine ore is used as a filler in concrete, and sometimes independently as a shielding material. The resultant experimental data on the spatial distribution of neutrons of various energies in serpentine ore agree well with the results of calculation done by the ROM-1 computer program using a specially compiled system of multigroup neutron constants. Only a slight difference is observed in the relative attenuation of the neutron flux density for measurements by resonance indicators. M. L.

USSR

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UDC 621.396.66(088.8)

BEKHTEREV, A. P., PECHENKO, V. V., TOYPIN, V. M., ERASTOV, R. A.

"A Device for Mechanically Tuning a Resonance Circuit"

USSR Author's Certificate No 255377, Filed 15 Jul 68, Published 24 Mar 70 (from RZh-Radiotekhnika, No 10, Oct 70, Abstract No 10V420 P)

Translation: The proposed device for mechanically tuning a resonance circuit contains a kinematic chain for adjusting the tuning element, a kinematic chain for fine tuning of this element, and a mechanism for switching the kinematic chains which is controlled by a mismatch pickup. As a distinguishing feature of the patent, the construction of the device is simplified and its operational reliability is improved by using a free travel mechanism as the mechanism for switching the kinematic chains. This mechanism is equipped with a sprocket which is connected to the shaft of the tuning element. Spring-supported rollers are wedged between the sprocket and the ring of the worm wheel for the kinematic chain used for fine tuning. The switching mechanism is also equipped with a fork fitted with lugs to unwedge the rollers.

028

UNCLASSIFIED

PROCESSING DATE--23OCT70

TITLE--SURFACE WAVES IN A PLASMA WITH AN OSCILLATING CURRENT. I. LONG WAVE
OSCILLATIONS OF A COLD BOUNDED PLASMA -U-
AUTHOR--(02)-SIDGROV, V.P., TSYPIN, V.S.

COUNTRY OF INFO--USSR

SOURCE--NUCLEAR FUSION, VOL. 10, MAR. 1970, P. 75-80

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TOPIC TAGS--PLASMA OSCILLATION, LOW TEMPERATURE, ELECTRON OSCILLATION,
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PROCESSING DATE--23OCT70

CIRC ACCESSION NO--A0101886

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. THE AUTHORS CONSIDER THE LONG WAVE OSCILLATIONS OF A COLD BOUNDED PLASMA AGAINST A BACKGROUND OF STEADY STATE ELECTRON OSCILLATIONS. THE PROBLEM IS SOLVED IN A NONLINEAR APPROXIMATION WITH RESPECT TO AN EXTERNAL HIGH FREQUENCY FIELD. IT IS FOUND THAT, AS IN THE CASE OF A CONSTANT CURRENT, THE SURFACE WAVES ARE UNSTABLE.

FACILITY: GOSUDARSTVENNYI KMOITET PO ISPOL'ZOVANIIU ATOMNOI ENERGII, FIZIKO TEKHNICHESKII INSTITUT, SUKHIMI, GEORGIAN SSR.

UNCLASSIFIED

1/2 036
 UNCLASSIFIED
 TITLE--SURFACE WAVES IN A PLASMA WITH AN OSCILLATING CURRENT. II. PLASMA
 SURROUNDED BY A SHEATH OF INFINITE CONDUCTIVITY -U-
 AUTHOR--(02)-SIDOROV, V.P., TSYPIN, V.S.
 COUNTRY OF INFO--USSR
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 WAVE, LOW TEMPERATURE PLASMA
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UNCLASSIFIED

PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0101887

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE AUTHORS INVESTIGATE SURFACE WAVES EXCITED IN COLD PLASMA BY AN OSCILLATING CURRENT, CONSIDERING CASES WHERE THE PLASMA IS BOUNDED (PLASMA LAYER AND PLASMA CYLINDER). IT IS PHYSICALLY CLEAR THAT ONE HAS TO TAKE INTO ACCOUNT THE ACTUAL GEOMETRY OF THE PLASMA CONFIGURATION WHEN THE DAMPING LENGTH OF A SURFACE WAVE IS COMMENSURATE WITH THE TRANSVERSE DIMENSIONS OF THE PLASMA. THE AUTHORS STUDY THE SURFACE WAVES WHEN THE PLASMA IS SURROUNDED BY A METALLIC SHEATH OF INFINITE CONDUCTIVITY. THE CONDITIONS ARE FOUND FOR THE BUILD UP OF THREE DIMENSIONAL SURFACE WAVES AND THE CORRESPONDING EXPRESSIONS DERIVED FOR THEIR FREQUENCIES AND GROWTH RATES. FACILITY: GOSUDARSTVENNYI KOMITET PO ISPOL'ZOVANIU ATOMNOI ENERGII, FIZIKO TEKHNICHESKII INSTITUT, SUKHUMI, GEORGIAN SSR.

UNCLASSIFIED

USSR

UDC 62-50

POLYAK, B. T., and TSYPKIN, YA. Z. (Moscow)

"Pseudogradient Adaptation and Learning Algorithms"

Moscow, *Avtomatika i Telemekhanika*, No 3, Mar 73, pp 45-68

Abstract: There are various algorithms for finding the unconditional extremum of some functional $J(c)$, which determines the optimality test. These include regular algorithms -- in which there is random gradient realization -- and searching algorithms -- in which the direction of motion is a finite-difference gradient approximation (Kiefer-Wolfowitz-type methods), a random vector (random search methods), or a determinate vector not directly related to the gradient. There are also situations in which the optimality test is undifferentiable, and in some cases a generalization of the gradient concept (the method of generalized stochastic gradients) can be used. And there are many adaptation and learning algorithms of a nongradient character.

The purpose of the present article is to develop a general approach to encompass the various situations from a unified standpoint. Such an

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USSR

POLYAK, B. T., and TSYPKIN, YA. Z., *Avtomatika i Telemekhanika*, No 3, Mar 73, pp 45-68

approach, based on the concept of the pseudogradient, considers an iterative algorithm of the form

$$c[n] = c[n-1] - \gamma[n]s[n].$$

It is assumed that there is a certain determinate smooth functional $J(c)$, which may be given a priori (if the initial problem is its minimization) or introduced artificially. $s[n]$ is said to be the pseudogradient of $J(c)$ at the point $c[n-1]$ if the following condition is satisfied.

$$\nabla J(c[n-1])^T Ms[n] \geq 0.$$

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USSR

POLYAK, B. T., and TSYPKIN, YA. Z., *Avtomatika i Telemekhanika*, No 3, Mar 73, pp 45-68

If $s[n]$ is the pseudogradient of $J(c)$ at each step, the iterative algorithm is said to be a pseudogradient algorithm.

The article proves a general theorem on the convergence of pseudogradient algorithms and gives various examples of its use.

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USSR

UDC: 62-50

TSYFKIN, Ya. Z."Quasi-Optimal Training Algorithms"

Moscow, Avtomatika i Telemekhanika, No 6, 1973, pp 31-40

Abstract: This paper introduces so-called quasi-optimal training algorithms, for which there is no need to transform matrices, a difficult and cumbersome procedure which has been used for determining and constructing training algorithms. The quasi-optimal algorithms simplify the computation procedure a great deal and permit a choice of algorithm parameters on the basis of an adaptive approach. The author begins his analysis by assuming a functional vector \vec{c} of

$$J(\vec{c}) = M\{Q(\vec{x}, \vec{c})\} = \int_{\vec{x}} Q(\vec{x}, \vec{c}) p(\vec{x}) d\vec{x}$$

which has a single minimum $\vec{c} = \vec{c}^*$ and has no critical points other than \vec{c}^* . Some ideas for simplifying problems connected with the realization of quasi-optimal algorithms in the general case are discussed.

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E. Mathematical Modeling of Thought Processes

USSR

UDC: 8.74

TSYPKIN, Ya. Z., KEL'MANS, G. K., EPSHTEYN, L. Ye.

"Teachable Automatic Systems"

Moscow, Tr. IV Vses. soveshch. po avtomat. upr. tekhn. kibernet., 1968. Optimal'n. i adaptivn. sistemy (Works of the Fourth All-Union Conference on Automatic Control [Technical Cybernetics], 1968. Optimum and Adaptive Systems), "Nauka", 1972, pp 182-193. Discussion pp 298-302 (from RZh-Kibernetika, No 5, May 73, abstract No 5V827 by the authors)

Translation: Teachable automatic systems are characterized by the capacity to improve their behavior (and properties) in the process of functioning. This paper discusses the principle of optimizing teachable automatic systems and reveals their possibilities and peculiarities.

The functioning of teachable automatic systems is based on algorithms of instruction in classifying observed situations (patterns).

The peculiarities and complexity of classifying situ-

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TSYPKIN, Ya. Z. et al., Tr. IV Vses. soveshch. po avtomat. upr. tekhn. kibernet., 1968. Optimal'n. i adaptivn. sistemy, "Nauka", 1972, pp 182-193, discussion pp 298-302

ations are determined to a considerable extent by the volume of a priori information. Based on minimizing a general functional of the type of average risk of erroneous classification, algorithms are obtained for classifying situations for different a priori and current information (algorithms with and without incentive).

It is shown that with special forms of loss functions both presently known and new algorithms of instruction and self-teaching can be obtained. The algorithms are used for constructing teachable control systems and an adaptive receiver of pulse signals.

The paper presents the results of an experimental study of an adaptive receiver. Bibliography of 20 titles.

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Miscellaneous

USSR

UDC 62-50

Editor TsYPKIN, Ya. Z.

Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki (Current Problems in Technical Cybernetics), Moscow, "Nauka", 1972, 312 pp

Abstract: This collection contains the reports of the 16th Conference of Young Specialists of the Institute of Management Problems, reflecting the newest lines in the development of technical cybernetics. The reports cover a wide range of questions, from the principles of element and apparatus design in computer technology to questions of designing large cybernetic systems.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

AL'PEROVICH, E.E.

Temperature Characteristics of Piecewise, Non-linear Function
Converters (FP)

UDC 681-14

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Abstract: The temperature characteristics of a non-linear diode network are examined, and an equation is given for the output current as a function of temperature for FP made up of such circuits. The question of compensating for temperature distortions of a quadratic FP is considered, a circuit is given which will compensate for this distortion, and the characteristics of this circuit are listed. Three illustrations, three bibliographic citations.

CHINAKAL, V. O.

The Use of Parametric Programming Methods to Solve the Problem of an
Optimal Mix of Petroleum Products

UDC 519.283:665.59

13

Abstract: The mathematical formulation of the problem of optimally mixing petroleum products is examined. Parametric programming methods and an analog computer are used to solve the initial problems. Six bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

SLEPOV, N. N.

Demodulation of a Signal With Real, Low-Frequency Filters in Systems of
Magnetic Pulse Duration Modulation Recording

18

UDC681.3

Abstract: A calculation is given for the coefficient of non-linear distortion for real Butterworth third- and fourth-order filters, and the effect of tape speed oscillations is considered. Four illustrations, six bibliographic citations.

VESELOVSKIY, G.G.

On One Method of Expanding the Logical Capabilities of a Magnetic
Threshold Element

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UDC 681.3.056

Abstract: This is an examination of a method of expanding the logical capabilities of a magnetic threshold element by creating 2-stage disjunctive-threshold circuits with one branched magnetic core. Examples of the practical use of this method are given. Five illustrations, five bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

BABUSHKIN, F. M.

The Choice of Optimal Scales for Analog Computers (with a Variable Time Scale)

UDC 681

28

Abstract: The task of choosing optimal scales is formulated as a problem in linear programming. An algorithm for decomposing a linear programming problem of many dimensions into a series of problems of small dimensionality is given. Examples are given. One illustration, four bibliographic citations.

AKIMOV, V.N.

A Method of Measuring Periodic Signals in the Presence of Interference and its Use for Measuring the Reactivity of a Nuclear Reactor

UDC 681.14

34

Abstract: The measurement of small increases in the reactivity of a nuclear reactor serves as an example in the examination of the problem of determining the amplitude of a periodic signal passing through a dynamic system and observed in the presence of interference. An extremal

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
transformation, which can be made with simple apparatus and ensures the minimum mean square error of measurement in a class of selective transformations, is presented. It is shown that the extremal transformation approaches the optimal in accuracy. A circuit is given for measuring the amplitude and increase in the activity of a nuclear reactor, and the results of its testing both with a model and an actual reactor are given. One illustration, seven bibliographic citations.

PETROV, A.A.

On One Method of Synchronizing an Analog Computer and a Digital Computer Functioning Together as a Hybrid
UDC 618.14

40

Abstract: A simple method is given for program synchronization of an analog computer with repeated decisions and a digital computer, working together as a hybrid. The method does not require external control of the operation of the analog computer or expenditure for auxiliary apparatus. Two illustrations, one bibliographic citation.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

ChERNYShev, R. N.

A Reference Voltage Source

UDC 618.14

42

Abstract: A technique is given for constructing highly stable reference voltage sources using a controlled oscillator, making it possible to design a single functional circuit for the source with output voltages ranging from 12 to 100 volts and more. The circuit and basic parameters of the source are given. Two tables, four illustrations, two bibliographic citations.

VERTLIB, V. A.

On the Choice of an Algorithm for Coupling Functional Devices into an Operator's Panel for Remote Controlled Systems

UDC 681.14

45

Abstract: Problems in evaluating an algorithm to connect individual functional devices into a complex are considered. The example given is the evaluation of an algorithm for functional devices used in operator panels of remote control systems. One table, two illustrations, two bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

LEBEDEV, V. S.

Problems in Making Typical Units of Digital Devices from Threshold Elements

52

UDC 681.14

Abstract: A set of typical threshold elements is given. Circuits are shown for several typical and specialized subunits and assemblies of digital systems and machines using the threshold modules. A comparison is made between the threshold element circuits and circuits of identical purpose using typical Boolean elements. The area where the use of threshold logic elements is most efficient is determined. Four tables, five illustrations, four bibliographic citations.

EYKEL'MAN, E. S.

Simulating Typical Non-linearities Using Silicon Stabilitrons

62

UDC 681.33

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

SHUMEY, A. S.

Syntactic Analysis by the Method of Determined Symbols

68

UDC 681.142.001:51

Abstract: Methods of syntactic analysis using precedent relationships are generalized. The concept of a determined symbol is introduced, the relationships among determined symbols are established, and some properties of these relationships in context-free grammars are analyzed. A new class of precedence grammars is distinguished, in which the precedence grammars of Floyd, Wirth and Weber are special cases. Two bibliographic citations.

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UDC 681-142-65

Abstract: An associative memory functioning as an associative processor (AP) to perform arithmetic operations is described. Some variations of algorithms to perform arithmetic operations of addition, subtraction, multiplication, and division are considered, and comparative evaluations are given of the time to perform these operations in the AP and in a digital computer. Six tables, one illustration.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

IRUGOV, B. S.

Characteristics of the "Man - Machine" Combination in Queuing Systems

UDC 681.33

76

Abstract: With the Aeroflot reservation and ticket sales system as an example, an analysis is made of the interaction between the human operator and the data-processing center. Contrasts to the interaction of the human with the machine in dispatching systems are formulated. The problem of generalizing this study in a given area is stated. One illustration, five bibliographic citations.

KRASNUSHKIN, Ye. V.

Accelerating the Search Process in Optimization with a Variable Feedback Sign

UDC 62-50

82

Abstract: The problem examined is that of accelerating the search process in the optimization of an inertia-free object with commutation of positive and negative feedback circuits closed by the controlled object. One illustration, two bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

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An Electromechanical Device for Monitoring and Measurement
UDC 62.50

85

Abstract: An electromechanical device for measurement and recording of up to 140 values represented as electrical voltages is described. The circuit principles of various subunits of the device, the principles of their action, and their possible modes of operation are examined. Two illustrations, two bibliographic citations.

KOTENKO, A. A.
Synthesizing the Structure of a Combined, Search-Free, Self-Regulating System
UDC 62.50

88

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
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example is given of the synthesis of one combined SSS. Two illustra-
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94

UDC 62.50
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from the known functions are discussed. A structural circuit diagram is
given for a computing device to determine a second-order sensitivity
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GACHINSKIY, E. Ye. and DRUZDOV, A.I.

The Choice of Parameters in an Automatic Search System with a Variable
Frequency of Probe Action

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UDC 62.50

Abstract: Approximating expressions are obtained which make it possible
to determine those values of the probe action frequency and parameters
of the output unit of an optimizer channel which will make the search
speed greater. The results of experimental tests with actual examples
are given. Four illustrations, four bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

KHANMAMEDOV, O.K.

Optimization of the Heterogeneous Catalysis Process in a Boiling Layer of Catalyst

UDC 62.50

103

Abstract: A multi-stage variation of technological process control is considered, using a simulation of catalyst aging. The necessary conditions of optimality for multi-dimensional and mono-dimensional problems are determined by an analytic solution of the problem using algorithms of the discrete maximum principle.

SOLOV'YEV, M. N.

On Control Priorities in Regulating Systems with Many Control Actions

UDC 62.50

106

Abstract: The principles of controlling systems with two control actions are considered. The concept of a "control action priority" is introduced. Various cases of control action priority determination are examined, including cases with a change of priorities. Three bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

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A Method of Solving Terminal Control Problems on a Hybrid Computer

109

UDC 62.50

Abstract: Methods of solving optimal control problems on analog and hybrid computers are examined. A technique is suggested for constructing circuits to solve optimal terminal control problems using penalty functions and a gradient minimization system. Eight bibliographic citations.

MAMEDLI, R. Z

The Identification of Linear Equilibrium Systems in the Presence of Random Input Discards

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UDC 62-52

Abstract: A system operator in the form of an impulse transfer function is determined. The problem is solved for cases with equilibria and non-equilibrium random functions in the system input.

DROZDOV, B. V.

The Spectral Density of Random Pulse Processes with Pulse Width Modulation

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

UDC 62-52

Abstract: A sequence of rectangular pulses with constant cycle time and random duration determined by a continuous modulating signal is examined. For a modulating signal in the form of an equilibrium random process with Gaussian distribution, expressions are obtained for the spectral densities of the pulse processes considered under 1- and 2-stage pulse width modulation of the first and second orders. An analysis is given of continuous and discrete components of these spectral densities. Nine bibliographic citations.

GINSBERG, K. S.

Adaptive Algorithms of Exponential Prediction

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UDC 62-52

Abstract: Heuristic algorithms are suggested for the prediction of stochastic signals in the absence of accurate a priori information about their statistical characteristics. Two tables, five bibliographic citations.

AKMAYEV, R. G.

On an Approach to Planning Groups of Automated Queuing Systems

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
UDC 62-52

Abstract: The problem considered is that of organizing the planning and introduction of groups of automated systems by organizations of the Ministry of Instrument Design, Automation Equipment, and Control Systems of the USSR, using a unified technical base. The sequence of system implementations and basic functions in each of them are determined from conditions of optimization on the over-all payoff time. Four bibliographic citations.

SPIVAKOVSKIY, S. I.
On a Problem in Queuing Theory
UDC 62-52

134

Abstract: The automaton considered is capable of servicing a series of requests from an over-all number N of streams in time Δt_n . The solution applies the apparatus of dynamic programming, and the appropriate functional controls are given. The example considered is the problem of optimally regulating the movement of transport at intersection ($N=2$). A program is developed for calculation on a computer. Five bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

OPOYTseV, V. I.

Optimal Divisions in Piecewise Linear Simulation

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UDC 62.52

Abstract: The identification of statistically noisy objects in a class of piecewise linear functions is examined. Characteristic properties are obtained for the optimal division of input signal change regions into subregions. Two bibliographic citations.

KATsNEL'SON, M. B. and RUBINSHTEYN, M. I.

The Formulation of some Problems in the Operational Management of Deliveries

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UDC 62-501

Abstract: A group of problems soluble in the process of operational management is presented. Types of criteria are discussed. The formulations of a number of problems in operational management are given

KATsNEL'SON, M. B., STAVROVSKIY, V. V., and SAGYNGALIYev, K. S.

On a Problem in Managing Deliveries in a Supply System

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UDC 62-501

Abstract: The article considers algorithms for solving problems of optimal circulation on a network with limitations of the form

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

$$\sum_{j=0}^m y_{ij} \leq A_i \quad \text{for the stream flowing from vertex } j.$$

One table, one bibliographic citation.

BERKOVICH, I. B., and PLOTINSKIY, Yu. M.

On Heuristic Methods of Solving Some Naval Management Problems

153

UDC 62.501

Abstract: Using the example of drawing up a monthly chart of ship dispositions, the authors discuss some difficulties in principle which must be encountered in solving problems of operational planning for sea transport. Some considerations are given which favor the creation of heuristic algorithms for this type of problem, and the basic ideas and most significant details of the heuristic algorithm for creating the chart are described. Four bibliographic citations.

BERSHCHANSKIY, Ya. M.

On an Approach to the Solution of a Multi-Extremal Problem in Resource Distribution

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
UDC 62-501

Abstract: The problem of distributing resources on a network graph for optimal speed is reduced to the minimization of a linear function on a non-convex set consisting of several intersecting convex polygons. A special method of solving a problem of this type is given. One illustration, five bibliographic citations.

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A Stochastic Approach to Some Problems in Nonlinear Programming 163
UDC 62-501

Abstract: The possibilities of extending the known deterministic formulations of problems in nonlinear programming to stochastic cases are considered. Both statistical and dynamic variations are mentioned. For the stochastic problems considered conditions of optimality are obtained and some computational procedures are suggested. One table, 14 bibliographic citations.

BRONSHTEYN, I. I.

The Processing of Uniform Information Input to a Computer 168
UDC 62-501

Abstract: An optimal strategy algorithm is suggested for processing uniform information received by a computer attached to a control circuit.
18/35

USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

The processing time for a batch of arriving information is minimized with the requirement that execution time must be identical for all programs. Each external device is designed to work only with one program.

BURKOV, V. N., IVANOVSKIY, A. G., and GORGIDZE, I. A.

Some Problems in Controlling Active Systems

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UDC 62-501

Abstract: The application of the principles of "open control" to the solution of problems in controlling active systems is discussed. Small inactive elements are given, their capabilities determined by plans with priority S_{ij} ($i=1,2,\dots,n$, $j=1,2,\dots,m$). The conditions of complete conformity of the active system (the coefficient of conformity is unity) are given. For the case $C_{ij} = C_j$, where $j=1,2,\dots,m$, the possibility of complete conformity is demonstrated and an algorithm to solve the problem is given. Three bibliographic citations.

TEREKHINA, A. Yu.

Problems in Production Loading and Distribution of Products Under Conditions of Shortage

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

UDC 62-501

Abstract: Models of product distribution under conditions in which it is impossible to satisfy all requirements without exceeding the production plans are considered. A multi-product distribution problem with mutually interchangeable demand is posed. A procedure is suggested for finding the plan (or set of plans) which will be preferable by the entire group of producers and consumers as a whole. One bibliographic citation.

NEGTSEVA, A. N.

On the Choice of a Structure of Hierarchical Control Systems

180

UDC 62-501

Abstract: The possibility of optimizing hierarchical control system structures by determining characteristic structural indicators and then using a formal procedure to reflect the effect of these indicators on system quality is examined. It is suggested that such structural indicators as the number of hierarchical levels in the system, the number and type of elements in the system, the "richness" of communications, and so forth be considered. Such generalized concepts as the cost of system installation, speed, accuracy, feasibility, and flexibility of system control are used to evaluate system quality.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
DAVIDOW, T. R.

On a Technique for Diagnosing Problems in Uniform Structures 182
UDC 681.3.001.019.3

Abstract: Problems in diagnosing defects for coordinate organized uniform structures, universal in the class of finite automata, are investigated. The diagnosis is performed at the structure cell level. Four illustrations, two bibliographic citations.

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On a Type of Functional Divisibility of Boolean Functions 184
UDC 681.3

Abstract: Necessary and sufficient conditions of divisibility, suitable for practical use, are obtained. An analytic formulation makes it possible to extend the criteria obtained to more complex cases than those known. Five bibliographic citations.

ChACHANIDZE, V. G.

The Synthesis of Logical Automata (K-l, K-R pole) in a Type of Uniform Structure 189
UDC 518.714.5

Abstract: Algorithms are suggested for the synthesis of logical
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USSR

TEYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
automata in a machine of uniform structure, consisting of a matrix with both small (10 x 10) and large numbers of elements. Examples of the creation of different circuits using the suggested algorithms and corresponding evaluations of these algorithms are given. Five illustrations, three bibliographic citations.

VOL'VOVSKIY, L. A.

The Implementation of Boolean Functions in a Uniform Structure 194
UDC 518.714.5

Abstract: Methods of synthesizing Boolean functions in a single type of uniform structure are examined. The methods are based on bracketed forms with identical and different orders of variable input in different brackets. Four illustrations, one bibliographic citation.

CHUBAROV, Ye. P., and BERLIN, N. S.

Dynamic Characteristics of some Optical Fields in Scanning Regulation 200
UDC 621.391

Abstract: In regulating parametric fields by a scanning local control action, the dynamic characteristics of the field as an object of regulation are required. In this work some optical fields (photo-
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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 321 pp
luminescent, photochromic), a humidity field, and a heat field (ignoring
and considering heat conductivity) are examined from this viewpoint.
Two tables, three illustrations, five bibliographic citations.

BOYARINOV, I. M.

On Decoding Cyclic Codes Which Correct Groups of Errors 205
UDC 621.391.015

Abstract: A method of decoding cyclic codes to correct single bursts of
errors without omission for length l or less is suggested. A technical
implementation of this method on linear switching circuits is considered.
Six bibliographic citations.

MUCHNIK, R. B.

Shortening the Recording of Time Signals 203
UDC 621.061

Abstract: Algorithms and programs are given for shortening the
recording of time signals by transforming these signals into sequences of
discrete symbols while retaining the basic information useful for signal
classification. Seven bibliographic citations.

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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

ANIPLOV, V. S. and GORIN, I. M.

A Combined Power Source for Ferrite Diode Logic Elements

210

UDC 621.307

Abstract: A combined pulsed power source has been developed and tested which generates 2-phase pulsed voltages with a constant volt-second integral and current pulses shifted, with respect to the voltage pulses, by a given interval.

The constancy of the volt-second integral is retained over a wide range of variations in supply and load voltages. The source ensures that the supply circuit is disconnected from the load in the intervals between pulses. Four illustrations, three bibliographic citations.

DZhIOYeVA, L. M., and MALYUTIN, V. I.

An Investigation of Single-Layer and Multi-Layer Magnetic Films With the Intention of Using Them in Logical Devices

216

UDC 621.081

Abstract: The results of studies of the magnetic properties of 3-component films (Ni-Fe-Co) are given: the field of anisotropy, the coercive force, the dispersion, and other values in single-layer and multi-layer structures. A choice is made of the optimal technological parameters, relationships of

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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

the components in the basic material, and thickness of magnetic and non-magnetic layers in multi-layer films for the purpose of designing fast-acting, reliable logical devices. Four illustrations, fifteen bibliographic citations.

MALYUTIN, V. I.

A Magneto-Optic Apparatus with a High Resolution for Studying Magnetic Film Memories and Logical Devices

220

UDC 621.081

Abstract: An apparatus based on the MIS-11 dual microscope and using the Kerr magneto-optic effect is described. The apparatus makes it possible to observe the domain structure of films at magnifications of 30, 88, and 150 times and also to study the local characteristics (coercive force, field of nucleus formation, field of contact, etc.) in sections of film with an area of about 0.03 square millimeters. One table, three illustrations, nine bibliographic citations.

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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

ZOTOV, V. D. and VINOGRADOVA, Ye. P.

A Study of the Possibility of Designing Solid State Scanning Devices 225

UDC 621.315

Abstract: The principles of design of semiconductor scanning devices of the vidiotor type are considered, theoretical calculations of the fundamental characteristics of the device are given, and the results of some experimental studies of laboratory examples are reported. Two illustrations, three bibliographic citations.

KRESHTAL, A. N.

A Unit With a Variable Transfer Coefficient on a Transistor Field as a Control Resister 228

UDC 621.081

Abstract: Methods and circuits are given for the linearization of field transistors in order to use them as control resisters. Methods of constructing units with variable transfer coefficients -- an adaptive component based on a field transistor -- are described. Four illustrations, three bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
ShEVChENKO, A. M.

On the Problem of Selecting a Quantization Frequency in a Digital Control System

232

UDC 681-14

Abstract: A technique is suggested for determining the decision output frequency of a digital computer to guarantee that the value of the first difference of the input signal to the computer will not exceed any previously assigned value. A frequency spectrum of possible rates of signal change in the input of the controlled object is constructed and used to determine the minimum permissible frequency of sampling of the system sensors. A comparison of the suggested technique with some others is made. Two illustrations, six bibliographic citations.

ChAChKhIANI, N. N.

The Correction of Errors in Information Storage and Transmission Devices 235

UDC 621.081

Abstract: The design of a device to monitor for correction errors in information storage devices is described. To detect and localize errors (down to the gate level) a Hamming code is used. The reproduction of information requires a gate which works in the variable redundancy mode. One table, three illustrations, four bibliographic citations.

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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

CHUBAROV, Ye. P. and KUBYSHKIN, V. A.

The Choice of Optimal Parameters for Active Control, Optical Scanning Systems

240

UDC 621.371.15

Abstract: Problems in choosing optimal parameters (primarily scanning speed) are analyzed for an active control, optical band scanning system. Temperature effects when thin film structures are heated by the moving power spot are investigated; problems in the optimal combination of information collection and action are considered; recommendations are made for apparatus to implement such systems. Two illustrations, seven bibliographic citations.

LEONT'YEV, V. A.

The Construction of a Hamilton Cycle Close to the Shortest on a Given Set of Points

244

UDC 621.383.93

Abstract: An algorithm is considered for obtaining a Hamilton cycle close to the shortest possible on a finite, complete, symmetrical graph. The algorithm consists of two stages, the first of which constructs

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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
convex or loosely convex polygons whose vertexes are units of the graph; each polygon in the sequence is contained within the preceding one. In the second stage, the set of polygons is combined in a sequence of pairs (or all at once) to minimize the total length in the Hamilton cycle. One table, two illustrations, seven bibliographic citations.

KONOVOLOV, S. M.

A Study of a Phase Optical-Acoustic Sensor of Angular Displacements 248
UDC 621.307

Abstract: The results of experimental studies of a phase optical-acoustic angular displacement sensor are given. On the basis of the data obtained, the possibility of using the sensor in an optical tracking system is analyzed. Four illustrations, five bibliographic citations.

ZOTOV, Z. D. and POLIKARPOV, S. P.

New Principles of Design for Semiconductor Optical Image Analyzers 250
UDC 621.315

Abstract: New principles are suggested for designing semiconductor devices to perform analysis of parametric fields to determine the zones which have designated information indicators. Devices for determining
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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp
extremal zones of parametric fields, devices for quantizing images of
parametric fields, and devices which make amplitude selection of optical
illumination are considered. The theoretical aspect of design possibilities
for devices of this type is discussed. Five illustrations, two bibliographic
citations.

ASRATYAN, A. A.

Some Problems in the Development of Photochromatic Devices for Information
Storage and Retrieval 256
UDC 621-081

Abstract: This work is represented in the collection by a summary. The
properties of photochromic materials are examined, and possibilities for
their use in information storage and reproduction systems are investigated.
A device for representing information in a 3-dimensional form is briefly
described. Three illustrations.

ASRATYAN, A. A.

Some Problems in the Development of Optical-Electrical Systems for
Reproducing Information with the Use of Liquid Crystals 257
30/35

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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

UDC 621-081

Abstract: The electro-optical properties of liquid crystals and their use in systems of information representation are considered. A 3-coordinate visual indicator is suggested, based on the use of the electro-optical effect in some types of nematic liquid crystals. One illustration, six bibliographic citations.

ZDOR, S. Ye. and KRAVCHENKO, A. M.

Methods of Optical Search for Moving Illuminated Objects of Small Dimension

UDC 535.8:535.241.13

259

Abstract: The possibility of using plane linear rasters with a variable step to determine the present coordinates of small targets moving on a background of motionless objects is considered. A circuit for the processing of coordinate information is described, and its resistance to interference is evaluated. Some calculated relationships are given. Three illustrations, three bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

ABRAMOVICH, A. G.

Training Machines to Recognize Defects in the Contraction Function of the Myocardium

263

UDC 62-50

Abstract: A method has been developed for recognizing heart diseases from electrokymograph (EKG) data, and it has been experimentally tested. A new algorithm is suggested for recognizing events, and it is compared with some known algorithms as applied to this problem. Three illustrations, five bibliographic citations.

LEVASHOV, O. V.

A Model of Image Analysis in a Visual System

268

UDC 62-50

Abstract: A model is suggested which involves the use of local detectors, consideration of the relative location of local indicators, and amplification; that is, learning with experience by complex as well as local detectors. The model has been developed as a program for computers. Three illustrations, sixteen bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

REKLAYTIS, V. K.

The Results of a Computer Simulation of an Image Recognition Algorithm
Based on the Properties of Vision

UDC 62-50

273

Abstract: This article gives some results obtained in experiments with a program which simulates a recognition algorithm based on some properties of visual perception. The recognition algorithm analyzes the object by sections and their spatial relationship; on the basis of the analysis a decision is made about the class of the object. The program makes it possible to obtain an evaluation of the efficiency of the process leading to the decision, which can be compared with the time to recognize identical classes in tachistoscope experiments. One table, nine bibliographic citations.

YaKhNO, V. P.

Some Simulated Representations of Time-Sequence Perception Processes

UDC 62-50

277

Abstract: An analysis is made of psycho-physiological data about the perception of time intervals and rhythmic sequences of pulses. Possible
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TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

mechanisms of operations for neuron structures actuated by the perception of signals of this type are considered. Five illustrations, four bibliographic citations.

TIMIN, Ye. N. and SHMELEV, L. A.

Computer Simulation of the Propagation of a Series of Spikes through a Nonuniform Nerve Fiber (Information Questions)

282

UDC 62-50

Abstract: Hodgkin-Huxley equations describing the propagation of a nerve pulse along a nonuniform, stimulated fiber were solved on a computer. The passage of a series of pulses along the fiber was studied. Experiments were carried out with various coefficients of amplification and various levels of excitability of the nerve fiber. On the basis of the results obtained, suggestions were made about the mechanisms of information transfer by neurons. One table, four illustrations, twelve bibliographic citations.

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USSR

TsYPKIN, Ya. Z., Aktual'nyye Voprosy Tekhnicheskoy Kibernetiki, 1972, 312 pp

TANENGOL'Ts, L. I.

On the Organization of the Receptive Field of a Ganglionic Cell of the Retina

288

UDC 62-50

Abstract: Studies were made of the effect of the strength and spatial characteristics of a light stimulus on the time distribution of pulses in the "response" of a ganglionic cell of the retina (pattern-response). Changes in the response pattern with changes in the level of light in the background were studied. Two illustrations.

SHARAYEV, G. A.

A Study of the Reactions of a Model of the Auditory System to Amplitude Modulated Signals

291

UDC 62-50

Abstract: A brief summary is given of existing theories of perception of simulated signals by the auditory system. On the basis of psycho-physiological data a hypothetical mechanism is suggested for processing such signals and is developed as a model of the neuron network. In light of the suggested mechanism, the problem of perceiving the pitch of complex sounds is examined. Six illustrations, nine bibliographic citations.

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