VASILYUK, V.K.; KHLEVNYUK, G.S.

Modernization of the GS-1 hydraulic carriage. Mashinostroitel' no.3:12 Mr '64. (MIRA 17:4)

MINASYAN, A.K.; KHLGATYAN, A.Kh.

Cultivation of hard wheat in the Armenian S.S.R. Izv.AN Arm.SSR. Biol.i sel'khoz.nauki 7 no.4:3-13 Ap '54. (MLRA 9:8)

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

KHLGATYAN, D.Kh.

Relation of the blepharoplast of trypanosomes to mitochondria. Vest. Mosk. un., Ser. 6: Biol., pochv. 20 no.1:13-16 Ja-F '65. (MIRA 18:1)

1. Kafedra gistologii Moskovskogo universiteta.

KHLIBANOV, Kh.F., red.; KL'MAN, G.A., tekhn.red.

[List no.13 of wholesale prices for cables, metal sleeves, flexible steel shafts, metal screens and concrete reactors] Prieskurant no.13 optovykh tsen na kabel'nye izdeliia, metallicheskie rukava, gibkie stal'nye valy, metallicheskie setki i betonnye reaktory. Moskva, Red.-izd. otdel, 1948. 301 p. (MIRA 11:6)

1. Russia (1923- U.S.S.R.) Ministerstvo elektropromyshlennosti. TSentral'noye byuro tekhnicheskoy informatsii.
(Electric apparatus and appliances--Prices)

POREGAYLO, V.M.(Moskva); SAMARIN, A.M.(Moskva); KHLIEBNIKOV, A.Ye. (Moskva)

Desulfuration of open-hearth converter iron by lime mixture in vacuum. Izv. AN SSSR.Otd.tekh.nauk. Met. i topl. no.5:17-21 S-O'62. (MIRA 15:10)

(Steel—Metallurgy) (Desulfuration)

KHLIMANOV, Viktor Isidorovich [Khimanau, V.I.]; IVANOV, M. [Ivanou, M.], red.

[Ripple, dear Neman! Short trips through the cities and villages of the Neman Valley] Shumi, Neman! Malen'kae padarozhzha pa garadakh i vaskakh pryniamonnia. Minsk, Vyd-va "Zviazda," 1965, 70 p. (MIRA 19:1)

KHLISTOVSKIY, Ye., mladshiy nauchnyy sotrudnik (Tashkent)

Artificial mediums for the propagation of cotton bollworms. Zashch. rast. ot vred. i bol. 10 no.12:44 '65.
(MIRA 19:1)

GRIGOR'YEV, G.; KHLISTUN, B.; BASHCHUK, S.; DANKE, V.; GUBIN, A.; BLINDER, L.

What should be the standard design for keramzit plants. Stroi.mat. 10 no.8:32-33 Ag '64. (MIRA 17:12)

1. Glavnyy inzhener Ul'yanovskogo kombinata stroitel'nykh materialov, Ul'yanovsk (for Grigor'yev). 2. Direktor zavoda keramzitovogo graviya, Khabarovsk (for Bashchuk). 3. Glavnyy inzhener zavoda krupnopanel'nogo domostroyeniya, Saratov (for Danke). 4. Glavnyy inzhener kombinata asbestotsementnykh konstruktsiy, Chimkent (for Gubin). 5. Nachal'nik Saranskogo domostroitel'nogo kombinata, Saransk (for Blinder).

ZHINGAROVSKIY, A.N.; KHLISTUN, B.S., insh.-konstruktor

Guidance system of the TG102 diesel locomotive. Elek. i tepl. tiaga 5 no.6:27-33 Je '61. (MIRA 14:10)
(Diesel locomotives)

KHLISTUN, V.F.

Hopper with vibrating grate for pouring concrete mix. Rats. i izobr. predl. v stroi. no.95:14-16 '54. (MLRA 8:7)

1. Otdel izobretatel'stva i ratsionalizatsii Ministerstva stroitel'stva. (Concrete) (Hoisting machinery)

SOV/122-58-8-10/29

AUTHORS: Petukhov, N.N. and Khlistun, V.I., Engineers

TITLE: Experimental Investigations of the Design Data of a Gyroscope-driven Truck (Eksperimental'nyye issledovaniya parametrov girovoznoy telezhki)

PERIODICAL: Vestnik mashinostroyeniya, 1958, Nr 8, pp 30-31 (USSR)

ABSTRACT: A gyroscope-driven carriage for factory transport was designed and made at the Novo-Kramatorskiy mashinostroitel'nyy zavod (Novo-Kramatorskiy Engineering Works). A flywheel of 770 mm diameter is directly driven by an electric motor and drives the input shaft of a speed-reducing gearbox through a speed-reducing V-belt transmission. The gearbox drives the wheel axle and contains a reversing gear. The total reduction ratio is 32.3 (30.2 in reverse). The carriage weighs 5 tons, is 4.83 m long, 1.85 m wide and 1.10 m deep. The flywheel weighs 1.28 tons and has a maximum speed of 1 500 rpm. The total energy accumulated in the flywheel is 119000 kgm. Over stages of 350 m, 48% of the flywheel energy is used. The maximum drawbar pull is 900 kg and the maximum speed is 5.7 kph (6.1 kph in reverse). The time for running up

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Experimental Investigations of the Design Data of a Gyroscope-driven Truck

the flywheel to 1 500 rpm is 1.7 min. Graphs plotted from experiments show the speed variation of the flywheel as a function of time and travel distance, the percentage of useful work as a function of the travelling distance and the maximum distance as a function of the drawbar pull. There are 6 figures.

1. Cargo vehicles--Design 2. Flywheels--Performance 3. Flywheels --Properties

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SOV/122-59-6-3/27

AUTHORS: Petukhov, N.N. and Khlistun, V.I., Engineers

TITLE: Investigation of the Basic Parameters of the Experimental Prototype of a Flywheel Inertia Driven Locomotive

PERIODICAL: Vestnik mashinostroyeniya, 1959, Nr 6, pp 12-16 (USSR)

ABSTRACT: Information is given about the first Russian-built experimental prototype of a flywheel inertia driven mine locomotive constructed at the Toretskiy zavod ugol'nogo mashinostroyeniya (Toretsky Works for Coalmine Machine-Building). Some measurements taken on the prototype are reported and the reasoning behind the choice of design parameters examined. The locomotive, weighing 6 300 kg, measures 1 400 mm in height, 1 330 mm in width and 3 140 mm in length. Its gauge is 900 mm. It has two flywheels, weighing 1 100 kg each and having a moment of inertia of 12.5 kg/sec^2. The initial speed is 3 000 r.p.m. The flywheels are driven by two pneumatic motors of 30 HP each. The drawbar pull at a friction coefficient of 0.17 is 1 070 kg. The traction speed varies from 8.1 to 2.69 k.p.h., when the flywheel speed drops from 3 000 to 1 000 r.p.m. Allowing this speed drop, the distance

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Investigation of the Basic Parameters of the Experimental Prototype of a Flywheel Inertia Driven Locomotive.

traversed with zero drawbar pull is 1.3 km, with 200 kg pull 0.975 km and with 400 kg pull, 0.77 km. At a compressed-air cost of 0.015 roubles per m^3, the cost of power per ton-km is 0.166 roubles for a train weight of 40 tons. With an air pressure of 5 a.p.m., the time for charging the locomotive is 9 min. The measurement of the running-out process of the flywheel has shown a mean resistance torque in the bearings of 0.283 kgm. Figure 2 includes a graph of the losses in the bearings as a percentage of the total losses as a function of initial flywheel r.p.m. At 3 000 r.p.m., the bearing losses amount to about 15%. It is stated that the choice of speed has proved justified. Evacuation of the flywheel casing or filling it with a light-weight gas is recommended. The aerodynamic friction can be reduced by a factor of 3 if a rotating shell is arranged around the flywheel inside a stationary casing. A method is given for computing the flywheel torque absorbed by the traction of the unloaded

Investigation of the Basic Parameters of the Experimental Prototype of a Flywheel Inertia Driven Locomotive

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locomotive. The overall efficiency of power transmission from the pneumatic motor to the flywheel is shown to be 20.4%. Several experimental curves and oscillographic records, showing the variation of flywheel r.p.m., the kinetic energy storage and the drawbar pull are given. The computation of the basic relationships of the flywheel locomotive is carried out and its numerical results are embodied in a family of curves (Figure 6) in which the distance traversed and the time are plotted against the flywheel r.p.m. at different drawbar pulls, for one or two flywheels working. It is concluded that the pneumatic motor speed and the transmission ratio were chosen correctly. There are 6 figures.

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KHLISTUN, V.I.; PETUKHOV, N.N.

Research on the basic parameters and areas of use of the TI-1 mine gyroflywheel locomotive. Vop. rud. transp. no.3:326-356 1959. (MIRA 14:4)

1. TGMZ.

(Mine railroads)
(Gyroscopic instruments)

KUKLANOV, I.N., inzh.; KHLISTUN, V.I.; SHCHERBAKOV, M.I.

Analysis of the designs of blastproof inertial mine locomotives with hydraulic drives. Vop. rud. transp. no.6:251-269 '62.
(MIRA 15:8)

1. Toretskiy mashinostroitel'nyy zavod.
(Mine railroads)

KHLISTUN, V.I., inzh.; TRUNIN, S.F., inzh.

Results of factory tests of leading models of the GR-4 mine gyroflywheel locomotive. Vop. rud. transp. no.5:324-336 '61. (MIRA 16:7)

1. Teretskiy mashinostroitel'nyy zavod.
(Mine railroads—Testing)
(Gyroscopic instruments)

KHLISTUN, V.I.; SHCHERBAKOV, M.I.

Calculation of the basic parameters of locomotives with gyroflywheels. Vop. rud. transp. no.7:210-223 '63. (MIRA 16:9)

1. Toretskiy mashinostroitel'nyy zavod.
(Mine railroads)

NOLANDT, O.N.; KHLISTUNOV, V.N.

Digital computers as a new milestone in instrument industry.
Inform.-tekh. sbor. MEP no.8:3-4 '58. (MIRA 12:1)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut elektrepromyshlennosti.
(Instrument industry)

28(1) SOV/119-58-11-7/15

AUTHORS: Kovalevskaya, V. V., Candidate of Technical Sciences, Nolandt, O. N., Engineer, Khlistunov, V. N., Engineer

TITLE: Building Principles for Digital Computers (Printsipy postroyeniya tsifrovykh priborov)

PERIODICAL: Priborostroyeniye, 1958, Nr 11, pp 19-23 (USSR)

ABSTRACT: If the attempt is made to systemize digital computers the following result is obtained:

I. Voltage- or resistance measurement is referred to a standard.
A) Electromechanical group.
   a) Voltmeter
   b) Ammeter
   c) Ohmmeter
B) Group equipped with tubes.
   a) Voltmeter

II. Measurement of time is referred to a standard
A) Tube line-up group.
   a) Frequency meter
   b) Phasemeter

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c) Voltmeter

The basic mode of operation of the devices belonging to groups I.Aa), II.Aa), II.Ab) and II.Ac) is described in short. The work of developing digital computers in the USSR began in 1935. F. Ye. Temnikov developed a two-digit compensator with digital report (tsifrovym otschetom).

14 foreign and Soviet devices are tabularized together with their most important data. The following originated from the Eastern Block:

a) Voltmeters
Producer: Penza Industrial Institute
Measuring order: direct-current voltage
Measuring sensitivity: 0,001 V
Measuring errors in %: ± 0,1
Measuring time: 1,5 s
Electromagnetic device with static compensation (steep selector). Determination of polarity is automatized.

b) Producer: NII. Autocompensator AK-4D connected with a strain gauge (tenzodatchik)
Sensitivity: 9.10^{-6}
Measuring errors: ± 0,02 %
Measuring time: 70 s

Electromagnetic device with static compensation. The device consists of a decade-magazine resistance, an amplifier for a two-phase tachogenerator, a balanced indicator, and a recording device.

c) Voltmeter: ETsVP-1
Produced at Penza
Measuring order: direct current voltage
Measuring range: 0,5 to 100 V
Measuring errors: $\pm$ 0,5 %
Measuring time: 1 s

d) Frequency meter
Producer: Akademiya nauk Rumynskoy nar.respubliki (Romanian Academy of Sciences)
Measuring range: 10, 100 kilocycles
Measuring errors: $\pm 10^{-6}$
Measuring time: 1 and 10 s. respectively

e) Phase-frequency meter NF-2
Produced at Penza
Measuring orders: Frequency, phase shift and number of pulses
Measuring range: 0,01 - 50 cycles, 0,02 - 100 s. (up to

200 kilocycles)
Measuring errors: 0,5 %
There are 5 figures, 1 table, and 7 references, 2 of which are Soviet.

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~~66007~~ 69617

AUTHOR: Khlistunov, V. N., Engineer

S/119/60/000/05/002/014
B014/B007

TITLE: The Approximation Error of Discreet Measuring Methods

PERIODICAL: Priborostroyeniye, 1960, Nr 5, pp 3-5 (USSR)

TEXT: In the introduction, a paper by F. Ye. Temnikov (reference footnote p 3) is quoted, in which the uses of digital instruments for automatic controls was investigated. In the present paper it was assumed that the dynamic error of instruments is of no consequence. The importance of the use of digital instruments for the purpose of measuring and recording quickly changing continuous quantities is shown. In these instruments, the continuously changing quantity is measured within certain time intervals Δt and their numerical value is given. The degree of approximation is determined by the statistical and the dynamic error of the instrument, and it is further assumed that no dynamic error of the instrument exists. The question arises as to the frequency of the measurements required in order that the error does not exceed a certain value δ. By means of the Newton formula of interpolation, formula (8) is developed for the interval of time between measurements, the expression (5) being assumed for the remaining term. Formula (8) permits determination of the frequency of discreet measurements in de-

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S/115/60/000/010/013/028
B021/B058

AUTHORS: Khlistunov, V. N. and Lavrov, V. P.

TITLE: Systematic Errors of the Time-Pulse Digital Converters

PERIODICAL: Izmeritel'naya tekhnika, 1960, No. 10, pp. 37-42

TEXT: The principal components of the errors can be divided into three groups: errors of the unstable feeding sources; the temperature changes of the medium, the discreteness. The errors of discreteness are not separately dealt with in this paper; their value is assumed to be ± 1 of the pulse. The errors of the converter were analyzed for the circuit diagram shown in Fig. 1. As for the errors of the voltage instability of the feeding sources, the influence of voltage variation of the valves is mentioned. Errors develop in the following units of the scheme: in the Π_1 diode in the rectifier installation, and in the generator of the linearly decreasing voltage; the errors are expressed in mathematical form. In the same elements of the scheme, errors also develop through anode-voltage instability. The equivalent scheme of the resistance-voltage circuit is shown in Fig. 2. Tables 1 and 2 were compiled on the basis of

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84655

Systematic Errors of the Time-Pulse Digital Converters

S/115/60/000/010/013/028
B021/B058

studies of a digital-voltmeter model, and the PPTV-1 (PPTV-1) potentiometer used. The summary errors through variation of the supply voltage are mentioned in Table 3. The errors of the temperature changes of the air medium are composed of: errors developing through the change of the parameters of the time-pulse circuit C-R_g at temperature changes, as well as deviations from the temperature dependence of a specimen frequency. In conclusion, it is stated that the biggest component of the error developing through the variation of the supply voltage is caused by the generator of the linearly decreasing voltage at a variation of the anode voltage. The error caused through a variation of anode voltage is bigger by dozens of times than the error from the same percentual variation of the filament voltage. The error through temperature change of the medium is small. The analysis method mentioned can be used for arbitrary schemes of time-pulse conversion. There are 2 figures, 3 tables, and 1 Soviet reference.

4

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B124/B204

9.7100 (also 1034)

AUTHOR: Khlistunov, V. N.

TITLE: On the applicability of Kotel'nikov's theorem in the discrete measurement technique

PERIODICAL: Izmeritel'naya tekhnika, no. 3, 1961, 25-28

TEXT: One of the most important problems in the theory of the analog-to-digital converters and digital computers is the estimation of the dynamical errors that arise on measuring of continuously varying quantities. Measurement of the variable quantity is based on the determination of their instantaneous values which correspond to the given values of an independent variable, for which time is taken in most of the cases. Three kinds of dynamical errors may be distinguished in discrete measuring systems: 1) Dynamical errors of the first class due to the funotional interrelation between the values of input and output signal, which differs from the respective interrelation on static conditions with respect to electric measurements. 2) Dynamical errors of the second class due to a variation of the investigated quantity on discrete measuring: the

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setting of the input signal level during discrete reading may be employed as a preventive measure. 3) Dynamical errors of the third class due to the discrete character of measurement by means of digital computers. The error in the representation of the continuous variable by a sequence of its discrete values is a function of the time intervals Δt in which the quantity is measured. On the assumption that the dynamical errors of first and second class do not exist and that the instantaneous values of the function are determined accurately the values of the continuously variable within the intervals between the measured values are still unknown. This kind of error may be termed an approximation error. The problem of a discrete transmission of continuous signals is theoretically solved by means of the frequency representation of the signal. The proof to Kotel'nikov's theorem is based on the expansion of the function f(t) into a series according to which

$$f(t) = \sum_{-\infty}^{+\infty} f(k\Delta t)\left[\sin\omega_0(t-k\Delta t)/\omega_0(t-k\Delta t)\right] \quad (1),$$

which shows that f(t) depends on the instantaneous values $f(k\Delta t)$ read in the interval $\Delta t = \pi/\omega_0 = 1/2f_0$ (f_0 denotes the maximum frequency in the spectrum of the

On the applicability of...

funotion investigated). The theorem states that the funotion f(t) within the interval T is uniquely given by its N discrete values: $N = T/\Delta t = 2f_c T$ (2). A judgement as to the applicability of this assumption of information theory for digital measuring systems may be made by means of an analysis of the possibility of fulfilling a number of specific requirements in the measurement technique, on which 1) no l.f. filter may be used at the output of the measuring system, 2) the character of the measured signal is unknown before measurement, 3) the approximation to the measured signal by means of the sum of sinusoidal functions of the type sin x/x is inconvenient for practical measuring, and 4) the approximation (quoted in Eq. (3)) to the investigated dependence for signals of complex shape yields a but slightly converging series. (2) is unsuitable for signals with nearly harmonic oscillations. According to the method of harmonic synthesis, the error of signal representation may be rendered by expanding into a Fourier series (Ref.4), e.g. for the aperiodic sinusoidal pulse

$$(x) = \sum_{n=1}^{\infty} [1/(2n-1)^3] \sin (2n-1)x = (\pi^2/8)x - (\pi/8)x^2$$ (3) holds for $0 < x < \pi$.

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The calculated values of the n terms are quoted in Table 1. For the dependence of the transformation frequency N on the accuracy of representation of the function for an exponential signal with time constant τ, the author found the relation: $N = (1/\pi) \tan \pi/2 \cdot (1 - k^2/n^2) \cdot (1/\tau)$ (5). The calculated values for τ=1 sec, the maximum number of different levels $F = 999\delta$, and for the error $\pm k\delta$ are compiled in Table 2. The linear approximation $N = 1/\Delta t_i = \sqrt{a_m/8\delta}$ (6) is sufficiently exact for the practice of discrete measurements; N denotes the frequency of discrete measurements, Δt_i the periods during which the instantaneous values of the investigated signal are measured, a_m the maximum value of the second differential of the signal in the section $t_n - t_o$, δ the given error of approximation. For a sinusoidal signal $x = A\sin\omega t$ Eq. (6) may be obtained by substituting the values $a_m = |\omega^2 A|$; $\gamma = \Delta A/A \cdot 100\%$ (A - amplitude of the signal) $N = \sqrt{\omega^2 A/8\Delta A} = \sqrt{(2\pi)^2 f^2 \cdot 100/8\gamma} = 22.2f/\sqrt{\gamma}$ (7) measurements per second holds, from which results the necessary number of measurements per

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period: $N' = 22.2\,T\,f/\sqrt{\gamma} = 22.2/\sqrt{\gamma}$ (8) (γ - approximation error, %). For a signal of exponential form the equalities $x = ae^{-1/\tau}$; $a_m = A/\tau^2$; $\gamma = \Delta A/A \cdot 100\%$ hold (A - maximum of the signal, A - absolute error). $N = \sqrt{100/8\tau^2\gamma} \approx 4/\tau\sqrt{\gamma}$ measurements per second (10). For the case that $\tau = 1$ sec, $N = 4/\sqrt{\gamma}$ measurements per second holds. There are 1 figure, 3 tables, and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc.

Legend to Table 1: 1) Error in the representation of the measured signal, γ,%; 2) number of considered harmonic components, n; 3) number of measurements required per period according to Kotel'nikov's theorem, N.

1 Погрешность представления измеряемого сигнала γ, %	1	0,5	0,1
2 Число учтенных гармонических составляющих, n	8	11	24
3 Число необходимых измерений за период согласно теореме Котельникова, N	16	22	48

Table 1

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1 Погрешность ±Δ%	0,5	1	3	5	10	50
Δ Погрешность, %	0,05	0,1	0,3	0,5	1	5
2 Частота преобразований, N/сек	735979,9	195405,1	22577	8077,8	2021	80,9

TABLE

Table 2

Legend to Table 2: 1) Error;
2) transformation frequency, N/sec.

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KHLISTUNOV, V.N.; ZHIVILOV, G.G.

Quick-acting self-controlled digital voltmeter. Izm.tekh. no.8:44-46 Ag '62. (MIRA 16:4)
(Voltmeter)

KLOCHKOV, G.A.; KHLISTUNOV, V.N.

High-speed digital millivoltmeter. Priborostronenie no.11: 16-20 N '63. (MIRA 16:12)

L 08507-67 EWT(d)/EWT(l)/EWP(v)/EWP(k)/EWP(h)/EWP(l)
ACC NR: AM6015393 Monograph UR/ 42 41 B+1

Khlistunov, Viktor Nikolayevich

Principles of digital electric measuring technology and digital transformers (Osnovy tsifrovoy elektroizmeritel'noy tekhniki i tsifrovyye preobrazovateli) Moscow, Izd-vo "Energiya", 66. 0344 p. illus., biblio. 13,000 copies printed.

TOPIC TAGS: electronic computer, digital analog converter, digital computer, electric measurement, electrometry, measure theory, error measurement

PURPOSE AND COVERAGE: This book described the principles of digital measuring technology and the construction principles of continuous descrete measuring converters. The problems of application of cybernetic methods in measuring technology are dealt with together with the peculiarities in the use of digital instruments. The book is intended for engineers who work in the field of measuring technology, automation and computer technology as well as for the students at institutes of higher learning of the same specialization.

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Card 2/2 afs

BALEVSKA, N.; MUSTAKOV, G.; IOVEV, S.; P. KHLIVANOV, P.

Some functional changes in pyoderma. Dermato vener Sofia 3 no.2: 98-101 '64.

1. Scientific Research Institute of Skin and Venereal Diseases, Sofia (Director: Prof. P. Popkhristov).

KHLIVENKO

KISELEV, A. (Zaporozh'ye); ABRAMOV, P. (Zaporozh'ye); BAYEV, G. (Zaporozh'ye); AGARKOV, V. (Zaporozh'ye); GOSTRYY, I. (Zaporozh'ye); MAYBORODA, I. (Zaporozh'ye); RUBANIK, I. (Zaporozh'ye); SMERDOV, A. (Zaporozh'ye); KHLIVENKO, V. (Zaporozh'ye); DOLGONOVSKIY, N. (Zaporozh'ye).

We support the patriotic initiative of the Muscovites; a letter from active members of mass defense work in Zaporozh'ye. Voen.znan.32 no.12:17 D '56. (MLRA 10:2)

1. Predsedatel' Dneprovskogo alyuminiyevogo zavodskogo komiteta Dobrovol'nogo obshchestva sodeystviya armii, aviatsii i flotu (for Kiselev). 2. Chlen komiteta (for Abramov, Bayev). 3. Obshchestvennyye instruktory (for Agarkov, Gostryy, Mayboroda, Rubanik). 4. Aktivisty oboronno-massovoy raboty (for Smerdov, Khlivenko). 5. Sekretar' Dneprovskogo zavodskogo komiteta Leninskogo kommunisticheskogo soyuza molodezhi Ukrainy (for Dolgonovskiy).
(Military education)

S/114/63/000/003/002/005
E191/E435

AUTHORS: Arkad'yev, B.A., Khlivnyak, G.G., Shatrovskaya, G.N., Engineers

TITLE: The solution of problems in nonstationary heat conduction with digital computer

PERIODICAL: Energomashinostroyeniye, no.3, 1963, 12-15

TEXT: The solutions of problems such as those arising from the equations of nonstationary heat conduction with the help of digital computers favors the method of "elementary balances", described by B.M.Kagan et al in their book (Resheniye inzhenernykh zadach na avtomaticheskikh tsifrovykh vychislitel'nykh mashinakh - The solution of engineering problems with automatic digital computers - Gosenergoizdat, 1958). The method permits the solution of the problem of transient heat conduction in homogeneous and non-homogeneous bodies with heat conduction coefficients and specific heats which depend on temperature and with any form of boundary conditions. The method is stated to possess a clearly expressed cyclic algorithm suitable for digital computers and is extended for use with more than one surrounding medium so as to include cooled designs. Some modifications are introduced to

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increase the time interval without loss of the stability of the solution. The stability criterion is the progressive change of temperature at each computing point. This condition leads mathematically to a formula from which the time interval in each successive step of iteration is found from previous results. An example was computed with the help of the single address computer "Ural-1" with fixed decimal points which has a computing rate of 100 operations per second and an operative memory of 1024 bits. The low capacity memory imposed the following limitations: The body has no internal heat sources. The physical properties are linear functions of the temperature but independent of the coordinates. The boundary conditions are independent of time. The number of surrounding media does not exceed four. The shape of the body can be rendered by a system of equal cubic elements. Some problems of programming are discussed. The computation procedure was applied to the initial period of heating-up a turbine stator component. Symmetry considerations made it possible to compute an element which constitutes one twelfth of the complete component and so permitted the use of Cartesian coordinates. Under assumed heat transfer conditions the time

The solution of problems ... S/114/63/000/003/002/005
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variation of temperature is illustrated in a graph giving a family of curves for a number of important points in the component. The loss of accuracy, compared with computations using a constant time interval, is shown to be small. The possibilities of improved computers are mentioned. There are 5 figures.

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KHLIVNYUK, O.T. Starshiy prepodavatel'

Absorption spectra of X-rayed sodium chloride crystals activated with copper and lead. Nauk. zap. Polt. derzh. inst. 13 no.3:53-56 '63 (MIRA 18:1)

KHLIYAN, L.D.

Hard-alloy blades for automatic cold-upsetting machines.
Mashinostroitel' no.3:15 Mr '64. (MIRA 17:4)

YAGUB'YAN, Ye.S.; BUKHALOVA, G.A.; KHLIYAN, T.M.

Enthalpy of the formation of K_2Cl_2. $BaCl_2$. Zhur.neorg.khim. 10 no.11:2581-2583 N '65. (MIRA 18:12)

1. Submitted January 18, 1964.

BUKHALOVA, G.A.; BABAYEVA, E.P.; KHLIYAN, T.M.

System of sodium, potassium, and lanthanum fluorides. Zhur. neorg. khim. 10 no.9:2127-2131 S '65. (MIRA 18:10)

KHLOBOSTIN, K.D.

Nicochlorane as an effective means against ectoparasites.
Veterinariia 41 no.3:109-110 Mr '65. (MIRA 18:4)

1. Starshiy veterinarnyy vrach Soyuznogo tresta po snabzheniyu sel'skogo khozyaystva veterinarno-zootekhnicheskim oborudovaniyem, instrumentariyem i medikamentami.

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"Basic problems and methods of studying the structures of ore fields and deposits". Reviewed by A.A.Khlobustov. Uzb.geol.zhur. 7 no.2:60-63. (MIRA 17:2)

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KOROLEV, A.V.; KHAMRABAYEV, I.Kh., doktor geol.-min. nauk, glav. red.; BATALOV, A.B., kand.geol.-min. nauk, sam. glav. red. [deceased]; BAYMUKHAMEDOV, Kh.N., doktor geol.-min. nauk, red.; BYKOV, L.A., red.; GAR'KOVETS, V.G., red.; KHLOBUSTOV, A.A., kand. geol.-min. nauk, red.; TERNOVSKAYA, R.M., red.; GOR'KOVAYA, Z.P., tekhn. red.

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(Ore deposits)

KHLOBUSTOV, A.A.

Method for measuring rock fractures. Izv. AN Uz. SSR. Ser. geol. no.4:77-82 '57. (MIRA 11:9)
(Faults (Geology))

KHLABUSTOV, A.A.

Role of stress concentration in the deformation of rocks and ores. Uzb.geol.zhur. no.3:45-58 '58. (MIRA 12:1)

1. Institut geologii AN UzSSR.
(Petrology) (Strains and stresses)

KHLOBUSTOV, A.A.

Folding in the Southwestern spurs of the Kyzylnur massif. Uzb. geol.zhur. no.1:9-20 '60. (MIRA 13:6)

1. Institut geologii AN UzSSR.
(Uzbekistan--Folds (Geology))

KHLOBUSTOV, A.A.

Making prognostic maps for the Kumyshkan deposit. Uzb. geol. zhur. no.2:46-57 '60. (MIRA 13:10)

1. Institut geologii AN UzSSR.
(Kumyshkan region--Geology--Maps)

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1. Institut geologii AN UzSSR.
(Earth)

KHLOBUSTOV, A.A.

Trends in experimental studies of rock deformations. Uzb.geol. zhur. 6 no.1:5-15 '62. (MIRA 15:4)

1. Institut geologii AN UzSSR.
(Rocks--Testing)

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Sorption of uranium by zirconium phosphate. Trudy MKHTI no.43: 89-94 '63. (MIRA 17:10)

KULOBYSTOV, N.V., Cand Tech Sci -- (diss) "Study of the operation of the pneumatic grain-panel of the grain handling machine."
Saratov, 1958, 17 pp with sketches (Min of Agr USSR. Saratov Agr Inst) 150 copies (KL, 27-58, 113)

KHLOBYSTOV, M.M., inzh.

Determining the optimum length for pipes of pneumatic grain cleaning machines and the speed of grains in an inclined flow. Trakt. i sel'khozmash. no.2:29-33 F '59. (MIRA 12:1)
(Grain handling machinery)

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(Grain--Cleaning)

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So: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.
Markushevich, A. I.
Rashevskiy, P. K.
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Markushevich, A. I.
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edited by Kurosh, A. G.
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Pochti absolyutno monotonnyye funktsii, DAN, 25 (1939), 725-728

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Nekotoryye interpolyatsionnyye svoystva absolyutno monotonnykh funktsiy, dvukh peremennykh. DAN, 28 (1940), 387-391.

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Mbr., Chemico-Technological Institute im. D. I. Mendeyelev, Moscow, -1944-

"The Differential Properties of Functions with One Non-Negative Finite Difference of Order n," Dok. AN, 47, No. 9, 1945

KVETSINSKIY, Ye.V.; KHLOMENOK, N.D.; SHEVCHUK, L.V., red.; KHOLODUL'KIN, A.A., tekhn.red.

[Electrification of the Omsk Railroad] Elektrifikatsiia Omskoi zheleznoi dorogi. Omsk, Omskoe obl.knizhnoe izd-vo, 1957. 41 p. (MIRA 13:3)

(Railroads--Electrification)

KUZNETSOV, K.N., inzh. (Omsk); KHACHEVSKIY, B.I., inzh.(Omsk); KHLOMENOK, N.D. (Omsk)

What experience has shown in the adoption of electric traction on the Omsk railroad. Zhel. dor. transp. 40 no.5:66-72 My '58. (MIRA 11:6)

1.Glavnyy inzhener sluzhby dvizheniya Omskoy dorogi (for Kuznetsov).
2.Nachal'nik sluzhby dvizheniya Omskoy dorogi (for Khachevskiy).
3.Zamestitel' nachal'nika planovo-ekonomicheskogo otdela Omskoy dorogi (for Khlomenok).

(Electric railroads--Management)

KHLOMENOK, N.D.

Experiences in preparation for the shift to a 7-hour workday. Zhel.dor.transp. 41 no.12:9-11 D '59.
(MIRA 13:4)

1. Zamestitel' nachal'nika planovo-ekonomicheskogo otdela Omskoy dorogi.
(Railroads--Management)

ACC NR: AR6015993 SOURCE CODE: UR/0271/65/000/012/A013/A014

AUTHOR: Khlomenok, P. N.

TITLE: Synthesis of quasioptimum automatic control systems with stepwise varying feedback

SOURCE: Ref. zh. Avtomatika, telemekhanika i vychislitel'naya tekhnika, Abs. 12A88

REF SOURCE: Mezhvuz. sb. tr. Zap.-Sib. sovet po koordinatsii i planir. nauchno-issled. rabot po tekhn. i yestestv. naukam, vyp. 4, 1965, 42-48

TOPIC TAGS: optimal control, automatic control design, ~~automatic control~~ electronic feedback

ABSTRACT: A second-order automatic control system is analyzed which has a fast transient response without over-regulation by virtue of a step-wise variation of its local rate feedback. The switching unit accomplishing this consists of a relay and a forcing circuit. The relay is activated whenever the error signal exceeds a certain threshold level. During "acceleration" the system is under the influence of positive or slightly negative feedback and during "braking" strong negative feedback is predominant. The response of this automatic control system is investigated, and the relay threshold level and the duration of transients are calculated. It is pointed out that this system is close to optimum and in comparison with the optimum systems is very simple (complex processors are not required), versatile, and provides a smaller acceleration of the output coordinate. [Translation of abstract] 5 illustrations

Card 1/2 UDC: 62-505

ACC NR: AR6015993

and bibliography of 8 titles. V. Sh.

SUB CODE: 09, 13

Card 2/2

ACCESSION NR: AP4009191 S/0288/63/000/003/0123/0126

AUTHOR: Khlomenok, P. N.

TITLE: High-speed automatic control systems with stepped modification of the input signal

SOURCE: AN SSSR. Sibirskoye otdeleniye. Izv. Seriya tekhnicheskikh nauk, no. 3, 1963, 123-126

TOPIC TAGS: automatic control system, SAR, optimum system speed, high-speed automatic control, high-speed system, input modification, minor damping, oscillatory transfer process

ABSTRACT: A series of high-speed automatic control systems (SAR), with a correcting differentiator in the mismatch circuit, combining SAR with deviation and perturbation control; SAR with nonlinear correction elements, computer devices, etc., are well known. In all of these systems, either the optimum criterion of minimum time in the transfer process, without overcontrol and with the least value of maximum acceleration (mini-max of acceleration) of the output coordinate, is not satisfied, or comparatively complex control devices are used.

Card 1/3

ACCESSION NR: AP4009191

An SAR with comparatively high speed may be obtained by modification of the input signal in systems with minor damping which favor oscillatory transfer processes and operate near the boundary of stability. The schematic of such a system is shown in Figure 1. Stepped modification of the input signal is investigated for this system, and the following conclusions are made: 1) a system of automatic control with stepped modification of the input signal may be considered near optimum in speed; an equation for the maximum acceleration of the output coordinate is derived and expressed by: $\ddot{X}_2=\ddot{X}'_2(0)=S_1$, where $\ddot{X}'_2$ is the second derivative of an output coordinate oscillation brought about by the first stepped signal, $\ddot{X}'_2(0)$ is the initial condition of this second derivative, and S_1 is the magnitude of the preliminary signal; 2) stepped modification of the input signal permits obtaining transfer processes without overcontrol in systems with minor damping which favor oscillations and operate near the stability boundary; 3) the control portion of similar systems is not complex and is a device for quantization of the input signal level; 4) stepped modification of the input signal corrects the transfer process similar to a corrector which introduces the second derivative into the control law. Orig. art. has 4 figures and 10 formulas.

Card 2/4 3

ACCESSION NR: AP4009191

ASSOCIATION: Omskiy mashinostroitel'ny*y institut (Omsk Machine Building Institute)

SUBMITTED: 22Feb63	DATE ACQ: 10Feb64	ENCL: 01
SUB CODE: EL	NO REF SOV: 005	OTHER: 002

Card 3/4

L 08476-67 EWP(k)/EWT(d)/EWP(h)/EWP(1)/EWP(v)

ACC NR: AR6017573 SOURCE CODE: UR/0196/66/000/001/K003/K003

AUTHOR: Khlomenok, P. N.

55
B

TITLE: Synthesis of near-optimum automatic control systems by means of incremental changes in the feedback loop

SOURCE: Ref. zh. Elektrotekhnika i energetika, Abs. 1K13

REF SOURCE: Mezhvuz. sb. tr. Zap.-Sib. sovet po koordinatsii i planir., nauchno-issled. rabot po tekhn. i yestestv. naukam, vyp. 4, 1965, 42-48

TOPIC TAGS: optimal control, nonlinear automatic control, automatic control design, automatic control equipment, automatic control R and D, nonlinear control system, automatic control system, nonlinear automatic control system, automatic control theory, negative feedback, positive feedback

TRANSLATION: A second order automatic control system is described, in which, by means of incremental variation of the local velocity feedback, a fast transient response is achieved without overcorrection. The unit controlling the variation of the feedback consists of a relay and a driver. The relay is actuated when the error signal exceeds certain threshold levels. During the acceleration of the system, either positive or small negative feedback is applied while during the deceleration, a strong negative feedback is used. The performance of this automatic control system is evaluated and

Card 1/2 UDC: 62-83:62-52

ACC NR: AR6017573

the threshold level for the relay actuation, as well as the duration of the transient process, are calculated. It is emphasized that this is a near-optimum system; simple, compared to other types of optimum systems (no complex external control is required); has greater flexibility and insures considerably lower accelerations of the output. 5 figures, 8 references. V. Shendrik.

SUB CODE: 13,09

Card 2/2

VASIL'YEVA, A.I.; GLUMOV, A.I.; KHLONINA, N.P.; KOSTINA, T.N.; ALEKSANDROV, F.T., starshiy nauchnyy sotrudnik, Laureat Gosudarstvennoy premii

The new factories should be equipped with high-capacity carding machines. Tekst.prom. 22 no.4:27-29 Ap '62 (MIRA 15:6)

1. Glavnyy inzhener Cheboksarskogo khlopchatobumazhnogo kombinata (for Vasil'yeva). 2.Nachal'nik novostroyashcheysya pryadil'noy fabriki No.3 Cheboksarskogo khlopchatobumazhnogo kombinata (for Glumov). 3.Nachal'nik chesal'nogo tsekha novostroyashcheysya pryadil'noy fabriki No.3 Cheboksarskogo khlopchatobumazhnogo kombinata (for Khlonina). 4.Nachal'nik proizvodstvennoy nauchno-issledovatel'skoy laboratorii Cheboksarskogo khlopchatobumazhnogo kombinata (for Kostina). 5.Vsesoyuznyy nauchno-issledovatel'skiy institut legkogo i tekstil'nogo mashinostroyeniya (VNILTekmash) (for Aleksandrov).

(Carding machines)

KHLONOV, Yu.P.

Growing Amur cork trees in Western Siberia. Trudy Bot. sada Zap.-Sib. fil. AN SSSR no.1:39-46 '56. (MIRA 14:7)
(Siberia, Western—Amur cork tree)

Khlonov, Yu. P.

USSR/Forestry - Forest Cultures. K.

Abs Jour : Ref Zhur - Biol., No 21, 1958, 95847

Author : Khlonov, Yu.P.
Inst :
Title : Artificial Plantings of Linden in West Siberia.

Orig Pub : V sb.: Materialy 2-y Nauchno-tekhn. konferentsii molodykh uchenykh ZSFAN, 1955 g. Novosibirsk, Knigoizdat, 1957, 3-10

Abstract : The natural expanse of Tilia sibirica and T. cordata are characterized. Types of forest to which these species are adapted are indicated, and their role and specific weight are shown in the formation of plantations; methods of renewal are described as well. Plantings of linden are described in subzones of pine-birch forests, of the northern forest-steppe and southern forest-steppe, in the steppe zone and in the foothill steppe and foothill forest-steppe belts.

Card 1/2

KHYLOV, G.V.; KHLONOV, Yu.P.

Conference on the general utilization and reproduction of Siberian pine forests. Izv.Sib.otd.AN SSSR no.11:105-107 '59. (MIRA 13:4)

(Siberia--Pine)

KHLONOV, Yu.P.

Siberian linden. Priroda 49 no.5:75-76 My '60.
(MIRA 13:5)
(Siberia--Linden)

KHLONOV, Yu. P.

Dissertation defended for the degree of Candidate of Biological Sciences at the Joint Scientific Council on Biological Sciences; Siberian Branch

"The Linden Tree [lipa] in Western Siberia (Distribution, Sylvicultural Qualities, Forest Types, and Artificial Stands)."

Vestnik Akad. Nauk, No. 4, 1963, pp 119-145

KHLONOV, Yu.P.; KRYLOV, G.V., doktor biol. nauk, prof., otv. red.

[Linden and linden forests in Western Siberia; distribution, silvicultural properties, forest types, artificial plantations] Lipy i lipniaki Zapadnoi Sibiri; rasprostranenie, lesovodstvennye svoistva, tipy lesov, iskusstvennye posadki. Novosibirsk, Red.-izd. otdel Sibirskogo otdniia AN SSSR, 1965. 153 p. (MIRA 18:8)

KHLONOVA, A.F.

KHLONOVA, A.F.

Establishing key species in determining the age of deposits by spore and pollen analysis. Izv.vost.fil. AN SSSR no.2:43-46 '57.
(MIRA 10:9)

1. Zapadno-Sibirskiy filial Akademii nauk SSSR.
(Pollen, Fossil)

KHLONOVA, Anna Fedorovna; GREYNER, R.N., red.; ZVONAREV, I.N., kand.geol.-mineral.nauk, red.; MAZUROVA, A.F., tekhn.red.

[Specific composition of pollen and spore complexes in upper Cretaceous deposits of the Chulym-Yenisey Depression] Vidovoi sostav pyl'tsy i spor v otlozheniiakh verkhnego mela Chulymo-Eniseiskoi vpadiny. Novosibirsk, Izd-vo Sibirskogo otdeleniia AN SSSR, 1960. 104 p. (Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy, no.3). (MIRA 14:8)
(Chulym Valley--Palynology) (Yenisey Valley--Palynology)

KHLONOVA, A.F.

Use of international rules for botanical nomenclature in describing fossil spore and pollen species. Izv.Sib.otd.AN SSSR no.8:150-152 '60. (MIRA 13:9)

1. Institut geologii i geofiziki Sibirskogo otdeleniya AN SSSR.
(Botany--Nomenclature)
(Palynology)

KHLONOVA, A.F.

Paleofloristic characteristics of the upper Cretaceous in the eastern part of the West Siberian Lowland based on spore-pollen analysis data. Geol.i geofiz. no.7:70-76 '61. (MIRA 14:9)

1. Institut geologii i geofiziki Sibirskogo otdeleniya AN SSSR, Novosibirsk.

(Siberia, Western--Paleobotany, Stratigraphic)

KHLONOVA, A.F., MARKOVA, L.G.

"Floral succession of pollen and spores from the Mesozoic sediments of western Siberia."

Report to be submitted for the Intl. Conf. on Palynology Tucson, Arizona. 23-27 Apr '62.

KHLONOVA, Geological Inst., AS USSR

SAKS, V.N., otv. red.; KHLONOVA, A.F., kand. biol. nauk, otv. red.

[Taxonomy and methods for studying pollen and spores] Sistematika i metody izucheniia iskopaemykh pul'tsy i spor. Moskva, Nauka, 1964. 230 p. (MIRA 17:9)

1. Akademiya nauk SSSR. Sibirskoye otdeleniye. Institut geologii i geofiziki. 2. Chlen-korrespondent AN SSSR (for Saks).

KHLONTSEVA, I. M.

"The Biology of Blossoming and Furit Bearing of the Best Possible Plum Varieties for the Leningrad Oblast." Cand Biol Sci, All-Union Acad of Agricultural Sci imeni Lenin (VASKhNIL), Leningrad, 1953. (RZhBiol, No 1, Sep 54)

SO: Sum 432, 29 Mar 55

KHLOPANOV, L.P.

Theory of electrolysis in a binary electrolyte on a rotating disk electrode. Zhur.fiz.khim. 37 no.7:1576-1581 Jl '63. (MIRA 17:2)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva.

KHLOPENKOV, P., inzh.

Floating ring with hydraulic brakes. Mech. transp. 22 no.7:40 Jl '63. (MIRA 16:9)
(Locks (Hydraulic engineering)—Equipment and supplies)

KAL'BERGENOV, G.K.; LYAKH, A.I.; KONSTANTINOVA, A.D.; KHLOP, N.I.

Fertilizer mixed with insecticide. Zashch. rast. ot vred. i bol. 7 no.8:35 Ag '62. (MIRA 15:12)

1. Institut sel'skogo khozyaystva nechernozemnoy zony, pochtovoye otdeleniye Nemchinovak, Moskovskoy oblasti. (for Kal'bergenov, Lyakh).
2. Saratovskaya toksikologicheskaya laboratoriya Vsesoyuznogo instituta zashchity rasteniy (for Konstatinova, Khlop).
(Fertilizers and manures) (Insecticides)

KHLOPENKOVA, G.V. [Khlopenkova, H.V.]

Mechanical creaseproofing of fabrics. Leh. prom. no.4:60-61 O-D '64 (MIRA 18:1)

Khlopenkova, L.P.

CHAYLAKHYAN, M.Kh.; KHLOPENKOVA, L.P.

On the role played by leaves in the development of winter plants.
Dokl. AN SSSR 112 no.4:774-776 F '57. (MLRA 10:4)

1. Institut fiziologii rasteniy im. K.A.Timiryazeva Akademii nauk SSSR. Predstavleno akademikom A.L.Kursanovym.
(Leaves) (Rape (Plant))

17(1), 17(4)

AUTHORS: Krasil'nikov, N. A., Corresponding Member, SOV/20-123-6-45/50
Academy of Sciences, USSR, Chaylakhyan, M. Kh., Aseyeva, I. V.,
Khlopenkova, L. P.

TITLE: On a Gibberella-Like Substance Formed by Soil Yeasts (O gibberellinopodobnom veshchestve, obrazuyemom pochvennymi drozhzhami)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6,
pp 1124 - 1127 (USSR)

ABSTRACT: The authors point out the stimulating effect exerted by the gibberella preparation Nr 1 which had been isolated by them, and by the pure gibberella A_3 on the growth of Rudbeckia bicolor (Ref 2). Physical-chemical properties and chromatograms characterized the mentioned preparation Nr 1 as gibberella A_3 or some compound related to it. The preparation investigated in the present paper comes from Torula pulcherrima, a yeast fungus that is especially prevalent in turf-bleaching earths. It grows well in media without nitrogen with and without addition of agar. On agar this yeast fungus forms

mucous, vaulted, semitransparent or transparent colonies deliquescing on the surface of the culture medium. Externally, they are very much like the colonies of Azotobacter chroococcum. Torula has very large (10—15μ and even more) regularly globular cells (Fig 1). They propagate by gemmation, without spores. For their multiplication the liquid synthetic medium of Chapek was used. There, they grow best. After the medium had become turbid (15 - 20 days), the active substance is obtained as a powdery raw product by adsorption on charcoal and elution with organic solvents. The preparation obtained proved to be highly active and was tested in comparison with gibberella preparation Nr 1 as well as with chemically pure gibberella A_3 on rosette-like plants of Rudbeckia bicolor.

The preparation in the form of a 0.02% aqueous solution (content of active substance in one drop about 10μ) was introduced dropwise into the center of the rosette or into the axil of an upper leaf of the plants. The controls developed water drops. Figures 2 and 3 as well as table 1 show that the physiological activity of gibberella A_3 (Fig 2:1) is equal to that of the preparation Nr 1 (Fig 2:2). The sample

from Torula is but little inferior as to the growing of the stems by 5-6 days, as to the formation of flower buds and the bursting by 9-10 days. The plants on the Torula preparation (Fig 2:3, 3:1) are of more compact structure, since the stem is abundantly foliaged, the leaves are of a deeper green, the internodes are shorter whereas the lateral shoots grow more regularly and are not so elongated. The controls remained always in the rosette stage (Fig 2:4, 3:2). This proves that gibberellas and their related substances are metabolites which are not specific for the Fusarium fungi alone, but are characteristic also of other microorganisms, in particular of soil-yeasts. There are 3 figures, 1 table and 3 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov) Institut fiziologii rasteniy im. K. A. Timiryazeva i Institut mikrobiologii Akademii nauk SSSR (Institute of Plant Physiology imeni K. A. Timiryazev and Institute of Microbiology of the Academy of Sciences, USSR)

CHAYLAKHYAN, M.Kh.; KHLOPENKOVA, L.P.

Factors governing stem growth in the rosette forms of long-day species. Dokl. AN SSSR 135 no.2:482-485 N '60. (MIRA 13:11)

1. Institut fiziologii rasteniy im. K.A.Timiryazeva AN SSSR. Predstavleno akademikom A.L.Kursanovym.
(Growth (Plants))