"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, V.R., inzh.

Using bimetal in welding steel with aluminum. Mashinostroenie no.1:41-44 Ja-F '63. (MIRA 16:7)

1. Institut elektrosvarki im. Ye.O. Patona.
(Electric welding)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

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NIKITINA, A.V.; RYABOV, V.R.; RABKIN, D.M.

Revealing the macro- and microstructure of weld joints between steel and aluminum. Avtom. svar. 16 no.4:83-85 Ap '63. (MIRA 16:4)
(Steel—Welding) (Aluminum—Welding) (Metallography)

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RABKIN, D.M.; RYABOV, V.R.; DOVBISHCHENKO, I.V.

Using helium and its mixture with argon in aluminum alloy welding. Avtom. svar. 16 no.9:1-6 S '63. (MIRA 16:10)

1. Institut elektrosvarki im. Ye.O.Patona AN UkrSSR.

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RYABOV, V. R. (Engineer) (Patona Institute of electric welding)

"Influence of intermetallic phases on properties of steel-aluminum welded joints" wasdevoted to kinetics of formation and growth of intermetallic phases. During welding of bimetals it is necessary to strictly maintain constant conditions, since exceeding them evokes a sharp increase of intermetallic layers along the lines joining.

Report presented at the 1st All-Union Conference on welding of heterogeneous metals, at the Inst of Electric Welding im. Ye. O. Paton, 14-15 June 1963. (Reported in Avtomaticheskaya svarka, Kiev, No. 9, Sept 1963, pp 95-96 author V. R. Ryabov)
JPRS 24,651 19 May 64

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, V.R.

Pressure welding of aluminum with steel publications review.
Avtom. svar. 16 no.10:47-53 O '63. (MIRA 16:12)

1. Institut elektrosvarki imeni Patona AN UkrSSR.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACCESSION NR: AP4020096 S/0304/64/000/001/0044/0048

AUTHOR: Ryabov, V. R. (Engineer)

TITLE: Preparation and testing of steel-aluminum joints by using bimetals

SOURCE: Mashinostroyeniye, no. 1, 1964, 44-48

TOPIC TAGS: bimetal, heat treatment, hardness value, intermetallic phase, weld joint

ABSTRACT: A method of producing bimetals using St.3 steel with AMg3, and AMg5V alloys or using high-strength complex alloy steel 28Kh3SNMVFA with alloys AMg5V and AMg6 as welded structures has been described. The amount of each component in the bimetal, the specimen size, heat-treatment temperatures, and the hardness value are tabulated in detail and discussed briefly. Several heat cycles were applied to sample bimetals, and the formation of a brittle iron-aluminum intermetallic phase was studied. The onset of this phase was noticed at temperatures exceeding 550C. A 40 x 120 mm bimetal specimen was prepared, and the strength and characteristics of the weld joints on each side of the bimetal with a steel plate welded on the steel side of the bimetal and aluminum plate on the aluminum

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ACCESSION NR: AP4020096

side were studied as a function of weld temperature. It was found that the weld on the steel side played the role of a heat source, slowing down the cooling of the whole specimen. The mechanical strength obtained from the welded specimen was 70-75% of the bimetal. Orig. art. has: 6 figures and 4 tables.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: MD NO REF SOV: 000 OTHER: 000

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L 16295-65 EWT(m)/EWA(d)/EPR/EWP(t)/EWP(b) Pg-4 IJP(c) MJW/JD/JT-2
ACCESSION NR: AP4045461 S/0125/64/000/009/0095/0096

AUTHOR: Ryabov, V. R. (Engineer)

TITLE: Conference on methods of producing aluminum clad steel

SOURCE: Avtomaticheskaya svarka, no. 9, 1964, 95-96

TOPIC TAGS: aluminum clad steel, aluminum alloy clad steel, aluminum clad steel production, clad steel production, clad steel welding, clad steel tube, AMg6 alloy

ABSTRACT: A conference on the production and use of structural aluminum clad steel was held at the State Committee of the Council of Ministers, Ukrainian SSR, in Kiev on 13 June 1964. V. A. Yashchenco, Chief specialist on the committee stressed the necessity of increasing the aluminum clad steel production in the Ukraine. P. F. Zashkha (Ural Institute of Ferrous Metals) stated that over 100 types of clad metals are produced at present in the USSR and that in 1963—1964 the Ural Institute of Ferrous Metals together with the E. O. Paton Electric Welding Institute has developed new types of aluminum clad steel for use in welded structures. V. K. Korol (All-Union Institute of

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L 16295-65
ACCESSION NR: AP4045461

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Light Alloys) reported on the manufacture of aluminum clad steel by the "symmetric sandwich" methods. IKh18N9T sheets and plates clad with AMg6 aluminum alloy are available in thickness of up to 12mm and sizes of 700 x 1000 and 1500 x 2000mm; the adhesion strength between the steel and cladding reaches 25 kg/mm^2. V. R. Ryabov (Electric Welding Institute) spoke on the welding of clad metal and on investigations of the weldability of twelve combinations of St3 steel and 1 x 18N9T steel with an aluminum-magnesium alloy. He also pointed out that heat treatment and welding have an adverse effect on the adhesion strength (if the transition zone is heated in excess of 520—535 C). Engineer Meandrov (Central Scientific Research Institute for Ferrous Metallurgy) stressed the necessity of developing ultrasonic inspection methods and equipment for this and the necessity of improving the methods of bimetal welding. Engineer Reznikov (Ukrainian Scientific Research Institute of Pipes) reported on the recently developed UDT-2 and UDT-4 devices for detecting the laminations in clad tubes with a wall thickness of 0.2—0.7 mm and the new EMD-3 thickness gage for measuring the thickness of the cladding. The conference resolved to organize the production of bimetals according to STU 59—60

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[Sovnarkhoz Technical Specifications] at the All-Union Institute of Light Alloys and at the Mikhaylovka Nonferrous Metals Processing Plant.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 14506-66 EWT(m)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b) IJP(c) HW/JD/HM

ACC NR: AP6003280 (N) SOURCE CODE: UR/0135/66/000/001/0009/0011

AUTHOR: Razduy, F. I. (Candidate of technical sciences); Zasukha, P. F. (Candidate of technical sciences); Ryabov, V. R. (Engineer)

ORG: none

TITLE: Welding of steel and aluminum structural elements by means of bimetal inserts

SOURCE: Svarochnoye proizvodstvo, no. 1, 1966, 9-11

TOPIC TAGS: bimetal, metal rolling, steel, aluminum, weldability, welding technology, shipbuilding engineering, material deformation

ABSTRACT: The development by the Ural Institute of Ferrous Metallurgy of a new method of producing Al-clad steel strip suitable for use as an insert in bimetal weldments is described. The method involves rolling a composite bimetal strip 6-12 mm thick, up to 300 mm wide and up to 2500 mm long, with a thickness ratio of Al to steel amounting to at least 2:1 and is based on the principle of "mono-component deformation," i.e. on the deformation of the plastic Al alloy alone during rolling, without the concomitant deformation of steel; at 380-450°C the Al alloy is fairly plastic and its deformation resistance is 8-16 kg/mm^2 whereas at these temperatures the deformation resistance of steel is 30-45 kg/mm^2 i.e. 3-4 times as high. This technique offers many advantages compared with the other known methods of rolling steel aluminum+bimetals:

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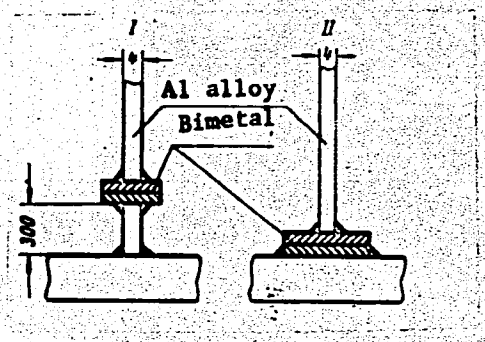

Fig. 1. Variants of joining the superstructure to the ship deck.

Joining of dissimilar metals 18

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ACC NR: AP6003280

only one rolling pass is needed instead of 3-5 and the extensive deformation of the Al alloy assures a reliable interlocking of the layers of bimetal strip. This type of strip is suitable for welding together steel and aluminum structural elements in shipbuilding, transport, aviation; the other types of Al-clad steel strips previously fabricated in the Soviet Union could not be used for this purpose because they consist of nonweldable Al alloys, armco iron and steel with low strength properties. Tests and metallographic examinations showed that this can be accomplished by means of a proper welding regime. Thus, during welding the depth of fusion from the Al-layer side should not be closer than 1 mm to the interlocking boundary, and from the steel-layer side, not closer than 1.5-1.8 mm, in order to preserve the adhesion between the two layers. The experimental introduction of this method in the joining of parts of a ship's superstructure of AMG5V aluminum alloy to the steel deck of its hull showed that of the two variants of joining tested (Fig. 1) the first variant was better. Some 30 running meters of superstructure were thus joined. The welded joints were tested for airtightness (0.1 atm) with satisfactory results. The new method results in welded joints of a better appearance and lower weight (~7 kg per running meter of joints) compared with riveted joints. Thus for example, in a ship with a steel deck and aluminum superstructure the total number of joinings required between aluminum and steel elements may reach 3000-4000; hence the total reduction in the ship's weight may reach 21-28 tons. Orig. art. has: 5 figures, 3 tables.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 004/ OTH REF: 002

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L 14507-66 EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b) MJW/JD/HM/JG

ACC NR: AP6003281 SOURCE CODE: UR/0135/66/000/001/0012/0014

73
66
B

AUTHOR: Ryabov, V. R., (Engineer); Yumatova, V. I. (Engineer)

ORG: Institute of Electric Welding im. Ye. O. Paton (Institut elektrosvarki)

TITLE: Mechanical properties of steel-aluminum welded joints

SOURCE: Svarochnoye proizvodstvo, no. 1, 1966, 12-14

TOPIC TAGS: arc welding, low carbon steel, stainless steel, aluminum alloy, welding technology, intermetallic compound, welded joint, solid mechanical property

ABSTRACT: At present the welding of pure Al to low-carbon and stainless steels is not a special problem. On the other hand, it is markedly difficult to obtain reliable welded joints of steel and aluminum alloys, e.g. AMg6 alloy. In this connection, the authors describe the techniques developed for the automatic argon arc fusion welding of joints of aluminum alloys and steels St.3 and Kh18N9T and the mechanical properties of these joints; these techniques differ for each of the steels: for steel St. 3 prior zinc-plating of the steel's surface is required and the argon-arc welding is performed by means of special wire electrodes for treating the weld with alloy elements; for stainless steel Kh18N9T prior alitizing of the steel with aluminum AV000 followed by welding with standard wire electrodes is required. Analysis of the strength-test findings and of their relationship to microstructure of the transition

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L 14507-66
ACC NR: AP6003281

zone showed that the strength of a welded joint of steel and aluminum or its alloys is the greater the smaller the thickness of the brittle intermetallide layer is. Hence, a reduction in the thickness of this layer or its complete elimination should enhance the strength properties of the welded joint. In this connection the effect the addition of various alloy elements by means of electrode wire on the properties of the intermetallide layer was investigated: the weld was treated with Si (up to 8%), Cu (up to 5%), Ni (up to 3%), Zn (up to 15%), Ba (up to 2%) and rare-earth elements (mischmetal) (up to 2%). The addition of 4-5% Si proved to be most effective, as it reduced the width of this layer to 3-5 μ. In this way the strength of these joints could be increased to ~30 kg/mm^2. Orig. art. has: 5 figures.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 000

Joining of dissimialr metals

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L 23416-66 EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k) IJP(c) JD/HM/JH

ACC NR: AP6004135 (N) SOURCE CODE: UR/0125/66/000/001/0010/0014

AUTHOR: Rabkin, D. M.; Dzykovich, I. Ya.; Ryabov, V. R.; Gordan', G. N.

ORG: Institute of Electric Welding im. Ye. O. Paton, AS UkrSSR (Institut elektrosvarki)

TITLE: Distribution of elements in the fusion zone during the welding of aluminum with steel

SOURCE: Avtomaticheskaya svarka, no. 1, 1966, 10-14

TOPIC TAGS: arc welding, bimetal welding, aluminum, steel, phase composition

ABSTRACT: This distribution was investigated by means of microradiographic and x-ray structural analyses for cases of different pre-welding treatment of both metals. Three types of steel-aluminum welded specimens cut out from the zone of transition from Al to steel were investigated: zinc-plated steel St. 3 (thickness of galvanic coating ~40 μ with aluminum AD1 (automatic double-arc welding); steel St. 3 with the Al alloy AMg5V (automatic argon arc welding, coated wire electrodes containing pure aluminum AV000 treated with 2 and 5% Si); alitized steel 1Kh18N9T with the alloy AMg6 (alitizing performed in pure aluminum AV000, with subsequent argon arc welding with standard coated AMg6 wire). Findings: the welding of zinc-plated steel St. 3 with aluminum AD1 results in a fusion zone containing 38-43% Fe. The constitution diagram

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shows that this corresponds to the presence of two phases in the layer: Fe_2Al_3, located more closely toward iron, and $FeAl_3$, located more closely toward Al. Welding with Si-treated coated wire electrode changes the phase composition of the fusion zone compared with the fusion zone of Zn-treated Fe-Al welds: the amount of the Fe_2Al_5 phase decreases and the width of the intermetallide layer is insignificant. Thus, silicon participates in the formation of the fusion zone by narrowing the region of existence of the most brittle phase Fe_2AL_5. As for the fusion zone of the welded joint of alitized -- in pure Al -- steel 1Kh18N9T with Al alloy AMg6, it was found to contain a lower (~24-25%) amount of Fe, which accounts for the particularly high strength of this type of welded joint. Orig. art. has: 2 formulas, 6 figures.

SUB CODE: 11, 13, 20/ SUBM DATE: 12Feb65/ ORIG REF: 007/ OTH REF: 005

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L 46244-66 EWT(m)/EWP(k)/T/EWP(w)/EWP(v)/EWP(t)/ETI IJP(c) JD/HM/JH

ACC NR: AP6023915 SOURCE CODE: UR/0363/66/002/007/1206/1212

AUTHOR: Rabkin, D. M.; Cherkashin, Ye. Ye.; Ryabov, V. R.; Zalutskaya, O. I.

ORG: Institute of Electric Welding im. Ye. O. Paton (Institut elektrosvarki); L'vov State University im. I. Franko (L'vovskiy gosudarstvennyy universitet)

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49
B

TITLE: Study of the phase composition of iron-aluminum welds

SOURCE: AN SSSR. Izv. Neorg materialy, v. 2, no. 7, 1966, 1206-1212

TOPIC TAGS: weld evaluation, iron compound, aluminum compound

ABSTRACT: Standard Debye powder patterns of the most stable phases of the Fe-Al system were obtained, and the variation of the lattice constant of the α phase with the quantitative content of aluminum was studied. The composition of the intermetallic interlayers in iron-aluminum welds was also investigated. The following series of phases was observed on passing from iron to aluminum: α-Fe - Fe_2Al_5 - ($FeAl_3$) - Al. It is shown that the weld undergoes brittle failure when the Fe_2Al_5 phase is present in the Fe-Al system, and that the strength of the weld is greater the lower the content of this phase in the interlayer. The Fe_2Al_5 phase was not observed in strong welds alloyed with other metals (Zn, Si, Cu, Ba). The phase composition of the intermetallic interlayers of these welds depends on the qualitative and quantitative composition of the alloyed aluminum filler wire. The following sequence of phases on passing from iron (steel) to aluminum is observed in welds alloyed with zinc (15%): α-Fe

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ACC NR: AP6023915

- Zn - Al; as the zinc content of the filler wire drops, the $FeAl_3$ phase appears. $FeZn_7$ (in welds alloyed with silicon), a small amount of $FeZn_7$ and traces of $FeAl_3$ (in welds alloyed with copper) and traces of $FeAl_3$ (in welds alloyed with barium) were found in addition to iron, zinc, and aluminum in welds alloyed with Si, Cu, and Ba. Precise determinations of the lattice constants of the phases in the welds showed the absence of an appreciable dissolution of other metals in α-Fe; in aluminum, the dissolution of other metals is already substantial, and it is still higher in zinc. Orig. art. has: 2 figures and 5 tables.

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joining of dissimilar metals

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 04717-67 EWT(m)/EWP(v)/EWP(t)/ETI/EWP(k) IJP(c) JD/HM

ACC NR: AP6027430 SOURCE CODE: UR/0125/66/000/007/0012/0015

AUTHOR: Fil'chakov, P. F.; Tarapon, A. G.; Burykin, A. Ya.; Ryabov, V. R. 87 86 B

ORG: [Fil'chakov; Tarapon; Burykin] Mathematics Institute AN UkrSSR (Institut matematiki AN UkrSSR); [Ryabov] Institute of Electric Welding im. Ye. O. Paton AN UkrSSR (Institut elektrosvarki AN UkrSSR)

TITLE: Investigation of the nonstationary heat field in the bimetal aluminum-steel 18

SOURCE: Avtomaticheskaya svarka, no. 7, 1966, 12-15

TOPIC TAGS: bimetal, aluminum, steel, welding technology, heat transfer, heat conduction, simulation, graphic technique

ABSTRACT: A method is described for simulating unstationary heat fields on electrically conducting paper. This method makes it possible to find the general principles of heat diffusion in the welding of metals in different combinations without resorting to complex experiments. Transitional heat fields were determined for different bimetallic combinations of AD1 or AMg6 aluminum and St.3 or 1Kh18N9T steel. The relationship was established between the time required for transition

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ACC NR: AP6027430

lines to reach unsafe temperatures and the ratio of the thicknesses and the thermophysical properties (heat conductivity and specific heat) of the dissimilar metals to be joined. Nomograms were constructed for calculating the time required for the aluminum-steel bimetal transition lines to attain critical temperatures (over 520°C). Orig. art. has: 1 table and 7 equations.

SUB CODE: 11, 13, 20/ SUBM DATE: 09Mar65/ ORIG REF: 003

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACC NR: AP7001927 (N) SOURCE CODE: UR/0125/66/000/012/0017/0021

AUTHOR: Ryabov, V. R.; Yumatova, V. I.

ORG: Electric Welding Institute im. Ye. O. Paton AN UkrSSR (Institut electrosvarki AN UkrSSR)

TITLE: Effect of filler wire composition on the strength of steel-to-aluminum welds

SOURCE: Avtomaticheskaya svarka, no. 12, 1966, 17-21

TOPIC TAGS: steel, aluminum alloy, metal welding, argon arc welding/AMts alloy, AMg5 alloy AMg6 alloy

ABSTRACT:

The effect of filler wire composition on the thickness of the transition zone and the strength of welds between carbon steel 3 and AMts, AMg5 or AMg6 aluminum alloys has been investigated. Steel and alloy specimens 5 mm thick were TIG welded with AK, AMg5, AMg6, or experimental filler wire containing (up to) 8% silicon, 5% copper, 15% zinc, 3% nickel, or 1.6% beryllium. The experiments showed that the strength of steel-aluminum joints increased with decreased thickness of the transition zone. Optimum results were obtained in welds made with a filler wire containing 4—4.5% silicon. These welds had a transition zone 3—5 μ thick and a tensile strength of 22—29 kg/mm^2. Copper at a content of

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2.5% decreased the thickness of the transition zone from 23—30 μ to 10—12 μ; in this case, the tensile strength reached 18—25 kg/mm^2. Nickel and beryllium had no effect on the thickness of the transition zone and the strength of welds. Zinc generally had a negative effect. Orig. art. has: 6 figures and 2 tables.

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L 3863-66 EPA(s)-2/EWT(m)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) IJP(c) JD/HM

AM5025576 BOOK EXPLOITATION UR/
621.791:546.72/74

Rabkin, D. M.; Ryabov, V. R.

Welding of aluminum and its alloys with steel and copper (Svarka alyuminiya i yego splavov so stal'yu i med'yu) Moscow, Izd-vo "Mashinostroyeniye", 1965. 093 p. illus., biblio. 7,000 copies printed.

TOPIC TAGS: metal welding, pressure welding, arc welding, cold welding, butt welding, corrosion resistance, spot welding, aluminum, aluminum alloy, steel, copper, iron aluminum alloy, metal property, seam welding

PURPOSE AND COVERAGE: The brochure presents data gathered from foreign and Soviet sources, and gives the results of research by the authors on various methods of welding aluminum, aluminum alloys to steel, and copper to aluminum. It describes requirements for preparing the surface of steel, aluminum, and copper for various welding methods; the methods and conditions of welding and welding-brazing steel to aluminum and its alloys; and the results of mechanical and metallographic research on ferro-aluminum compounds. It is intended for engineering-technical workers in the field of welding heterogenous metals and alloys.

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SUB CODE: MM SUBMITTED: 19Feb65

NO REF SOV: 020 OTHER: 014

Joining of dissimilar metals

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ACCESSION NR: AP5021986 UR/0286/65/000/014/0061/0061
621.791.856.3

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B

AUTHOR: Rabkin, D. M.; Ryabov, V. R.; Yumatova, V. I.; Doroshenko, M. T.

TITLE: Method of automatic argon-shielded arc welding of high-strength aluminum alloys. Class 21, No. 172931

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 14, 1965, 61

TOPIC TAGS: aluminum alloy, magnesium containing alloy, high strength alloy, alloy welding, arc welding, shielded arc welding, automatic welding/AMg6 aluminum alloy

ABSTRACT: This Author Certificate introduces a method of automatic argon-shielded arc welding of high-strength aluminum alloys of the AMg6 type to steel. The steel part is aluminized before welding. According to this method, the arc path is shifted to the aluminum side and the filler wire path to the steel side. In a modification of the method, the edges of the steel part are leveled on both sides at an angle of 70—75 deg without leaving a root face. [MS]

ASSOCIATION: Institut elektrosvarki im. Ye. O. Patona AN UkrSSR (Electric Welding Institute, AN UkrSSR)

Card 1/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 3085-66

ACCESSION NR: AP5021986

SUBMITTED: 24Apr64

ENCL: 00

SUB CODE: MM

NO REF SOV: 000

OTHER: 000

ATD PRESS: 4104

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, V.R., insh.; DUPLYAK, V.D., insh.

Interaction of molten aluminum with hard iron. Svar. proizv. no.2: 42-43 F '65. (MIRA 18:3)

1. Institut elektrosvarki im. Ye.O.Patona (for Ryabov). 2. Kiyevskiy politekhnicheskiy institut (for Duplyak).

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 43001-65 EPA(s)-2/EWT(m)/EPF(n)-2/EWP(v)/EPR/T/EWP(t)/EWP(b)/EWA(c) Pf-4/
Ps-4/Pu-4 IJP(c) MJW/JD/WW/HM/JG UR/0125/65/000/004/0079/0080

ACCESSION NR: AP5010179

114
50
B

AUTHOR: Ryabov, V. R. (Engineer)

TITLE: Second All-Union conference on welding dissimilar metals

SOURCE: Avtomaticheskaya svarka, no. 4, 1965, 79-80

TOPIC TAGS: metal bonding, metal welding, metallurgic conference, titanium, aluminum, steel, copper, nickel, molybdenum, zirconium, columbium, electronic equipment

ABSTRACT: The Second All-Union Conference on Welding of Dissimilar Metals was held 21-22 January 1965 at the Institute of Electric Welding im. Ye. O. Paton in Kiev. About 200 representatives of 92 institutions attended the conference.

D. A. Dudko (Institute of Electric Welding), in his opening statement, noted research on the welding of titanium or stainless steel to aluminum, and of copper to steel, completed since the first conference, and the successful introduction of newly developed welding methods in industry.

Card 1/6

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L 43001-65

ACCESSION NR: AP5010179

N. N. Rykalin (Academy of Sciences USSR), M. Kh. Shorshorov, and Yu. L. Krasulin (Institute of Metallurgy im. Baykov) spoke on the physico-chemical fundamentals of joining dissimilar metals and discussed the mechanism and energy conditions of the formation of compounds with various bond types.

N. F. Kazakov and K. Ye. Charakhina analyzed the conditions of formation of intermediate phases in titanium-iron, titanium-copper, and copper-iron in diffusion bonding with the use of inserts.

S. M. Gurevich (Electric Welding Institute) reported on research at the Institute on welding titanium to steel or copper.

V. N. Kryukovskiy, L. N. Zhuravlev, V. I. Komkova, and N. M. Yevgrafov (Moscow) spoke on arc and electron-beam welding of OT-4 titanium alloy to Kh08 bronze.

L. G. Strizhevskaya and L. L. Starova (Moscow) discussed specific features of welding α- and β-titanium alloys to niobium-, zirconium-,

Card 2/6

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L 43001-65
ACCESSION NR: AP5010179

copper-, and aluminum-base alloys.

V. I. Kryukovskiy, V. I. Komkova, N. N. Yevgrafov, and L. N. Zhuravlev (Moscow) reported on welding of a molybdenum alloy to a steel or zirconium alloy.

I. D. Ponimash, Yu. P. Garanin, and I. M. Saratov (Obninsk) discussed the welding of molybdenum to EI838 steel.

G. A. Bel'chuk (Leningrad Shipbuilding Institute) spoke on welding of zinc- or aluminum-plated steel to aluminum alloys and disclosed that several composite steel-aluminum structures welded in 1964 are now being tested under service conditions.

Several other speakers discussed welding of aluminum and aluminum alloys to dissimilar metals, as follows:

T. N. Zinov'yeva (Moscow). The effect of lanthanum and other rare-earth elements in calorizing and welding of stainless steel to AMts aluminum alloys.

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L 43001-65

ACCESSION NR: AP5010179

V. V. Verbinskiy (Dnepropetrovsk). Experimental welding of AMg6 aluminum alloy to 1Kh18N10T steel.

D. M. Rabkin, V. R. Ryabov, and I. Ya. Dzykovich (Electric Welding Institute). Phase composition of the weld between steel and aluminum.

V. R. Ryabov and V. I. Yumatova (Electric Welding Institute). Improving the strength of weld between AMg5 or AMg6 aluminum alloys and steel by alloying the welding wire with silicon, copper, zinc, and nickel (a strength of about 30 kg/mm^2 was achieved).

N. G. Geynrikhsdorf (N. Tagil). Welding of aluminum alloys to calorized stainless steel (weldments are used in service).

M. L. Loshchinskiy (Moscow). Laser welding of aluminum and nickel and other dissimilar metals.

The following reports dealt with cladding of steel with various metals:

Card 4/6

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 43001-65

ACCESSION NR: AP5010179

P. I. Zasukha, V. D. Korshchikov, G. D. Kozlov, V. K. Nikiforov, Ye. P. Karpov, and A. A. Yershov (Ural Scientific Research Institute of Ferrous Metals). Cladding of carbon and alloy steels with AMg5V and AMg6 aluminum alloys by pack rolling.

V. K. Korol' and N. D. Lukashkin. Cladding of 1Kh18N10T steel with aluminum alloys (multipass rolling with the use of pure aluminum inserts produces a shear strength of 10—12 kg/mm^2).

N. G. Ostapenko (Electric Welding Institute). Explosive bonding of titanium to steel, niobium and zirconium to stainless steel, copper to aluminum, and other dissimilar metals in specialized equipment.

Three reports dealt with welding dissimilar metals in the electronic industry:

A. F. Khudyshev (Moscow). Electron-beam welding of dissimilar metals and alloys used in electronic instruments (specialized welders with optical

Card 5/6

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 43001-65

ACCESSION NR: AP5010179

M. V. Venzovskiy (Moscow). Vacuum diffusion bonding of dissimilar metals, such as copper or nickel to steel and titanium to nickel, in the manufacture of electronic instruments.

M. S. Muranova, M. G. Ageyeva, and Ye. Ya. Shalimov (Moscow). Diffusion bonding and electron-beam welding of cathode materials used in thermionic converters.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM, EC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 3232-F

Card 6/6

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, V.S., polkovnik; KALASHNIK, M.Kh., general-leytenant, obshchiy red.; KURGAN, V.G., polkovnik, red.; SOLOMONIK, R.L., tekhn.red.

[People and army are one] Narod i armiia - ediny. Moskva, Voen. izd-vo M-va obor.SSSR, 1959. 607 p. (MIRA 12:12)
(Russia--Armed forces)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACHARKAN, V.A.; BARSKOV, I.M.; BIRYUKOV, I.S.; BORODINA, L.Ya.; BRENNER, M.M.; GORELIK, B.Ye.; GUMEROV, M.N.; ZORKAYA, N.M.; IOYNISH, A.I.; KAYDALOVA, O.N.; KAPUSTIN, Ye.I.; LEBEDEVA, M.A.; LESHKOVTSEV, V.A.; LYSENKO, V.P.; MARKIN, A.B.; MIKHAYLOV, N.N.; NEST'YEV, I.V.; NECHAYEV, N.V.; NIKOL'SKIY, A.V.; OSTROUKHOV, M.Ya.; PISARZHEVSKIY, O.N.; POLUBOYARINOV, M.M.; POPOV, Yu.N.; PRASOLOV, M.A.; POKATAYEV, Yu.N.; RIMBERG, A.M.; RYABOV, V.S.; SEMKOV, B.F.; SPERANSKAYA, Ye.A.; TAKOYEV, K.F.; TRIFONOVA, G.K.; TROFIMOVA, V.I.; SHAKHNAZAROV, G.Kh.; SHKARENKOVA, G.P.; SHMERLING, K.G.; EYDEL'MAN, B.I.; MIKAELYAN, E.A., red.; MUKHIN, Yu.A., tekhn.red.

[U.S.S.R. as it is; a popular illustrated handbook] SSSR kak on est'; populiarnyi illiustrirovannyi spravochnik. Moskva, Gos.izd-vo polit. lit-ry, 1959. 462 p. (MIRA 12:2)

(Russia)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Vasiliy Sergeyevich; TOKAREV, M.F., polkovnik, red.; KUZ'MIN, I.F., tekhn.red.

[Soldier and citizen] Voin-grazhdanin. Moskva, Voen.izd-vo M-va obor.SSSR, 1959. 63 p. (MIRA 12:7)
(Soldiers--Civil status) (Russia--Politics and government)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Vasiliy Sergeyevich, podpolkovnik; SHIGOREV, P.A., polkovnik, red.; MEZHERITSKAYA, N.P., tekhn.red.

[Honor and dignity of the Soviet soldier] Chest' i dostoinstvo sovetskogo voina. Moskva, Voen.izd-vo M-va obor. SSSR, 1957. 84 p. (MIRA 11:5)

(Russia--Armed forces)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, V.V.

Compiling schematic outline structural maps on the basis of tectonics derived from geological and geomorphological data. Trudy SNIIGGIMS no.9:111-115 '60. (MIRA 14:7)
(West Siberian Plain --Petroleum geology)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, V.V.

Honing gear-wheel teeth. Stan.i instr. 33 no.8:23-24 Ag '62. (MIRA 15:8)

(Gear cutting)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

OLLI, I.A.; RYABOV, V.V.

Second interdepartmental conference for coordination in oil and gas prospecting in Siberia and the Far East. Geol. i geofiz. no.11: 118-119 '60. (MIRA 14:2)

(Siberia—Prospecting)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, YE.

Radio

Attract more women to radio technology. Radio, 29, No. 3, 1952.

Monthly List of Russian Accessions, Library of Congress, June 1952. Unclassified.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Ye.A.

Third All-Union Public Inspection of the Quality of Construction Work. Stroi. mat. 11 no.10:22-23 O '65. (MIRA 18:10)

1. Zamestitel' nachal'nika Glavgosstroyinspektsii SSSR.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A., inzh.; DANYUSHEVSKIY, Z.M., inzh.

All-Union inspections of the quality of construction. Prom. stroi. 43 no.10:2-4 '65. (MIRA 18:11)

1. Glavgosstroyinspektsiya Gosstroya SSSR.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Ye.G.

With their own hands. Zdorov'e 2 no.6:15-17 Je '56. (MLRA 9:8)

1. Nachal'nik lagerya shkoly No.46 Frunzenskogo rayona Moskvy.
(CAMPING)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

VOROB'YEV, P.I.; YESAYAN, Ye.R.; RYABOV, Ye.I.

IAkov Alekseevich Vlasov; October 22, 1900 - November 5, 1963.
Pochvovedenie no.5:119 My '64. (MIRA 17:9)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACC NR: AP6036406 SOURCE CODE: UR/0148/66/000/011/0113/0117

AUTHOR: Kidin, I. N.; Lipchin, T. N.; Ryabov, Ye. S.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splanov)

TITLE: Investigation of effect of the electrothermal treatment on the mechanical properties of 40KhN steel

SOURCE: IVUZ. Chernaya metallurgiya, no. 11, 1966, 113-117

TOPIC TAGS: steel, structural steel, low alloy steel, high strength steel, electrothermal treatment, cyclic electrothermal treatment, steel property/40KhN steel

ABSTRACT: Speciments of 40KhN steel (0.42% C, 1.02% Cr, 1.29% Ni, 0.41% Mn) wire annealed at 850C furnace cooled at 900C and air cooled were subjected to cyclic heat treatment (CHT): heated electrically at a rate of 50 deg/sec to the austenitizing temperature (870C), air cooled at a rate of 50 deg/sec to 650 or 450C and held at these temperatures for 30 and 200 sec, respectively, after which the cycle was repeated. After two cycles (experimentally determined to be the optimum number of cycles), the specimens were reheated to the austenitizing temperature, water quenched, tempered and tested for mechanical properties. The tests showed that CHT improves significantly the strength and ductility (Fig. 1), especially those of air-cooled wire. The strength of furnance-cooled wire was slightly lower and the ductility higher, probably because of a different amount of structurally free ferrite. Iso-

UDC: 669.15—194 : 669.26'24 : 621:785.545 : 620.17

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ACC NR: AP6036406

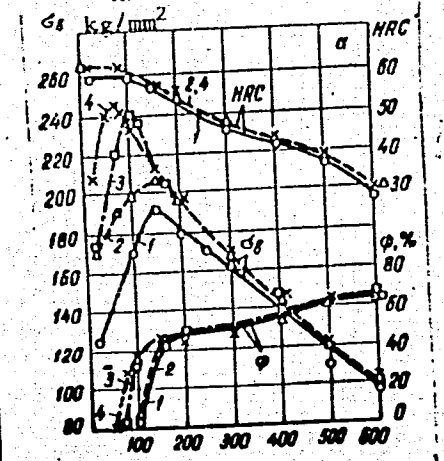

Fig. 1. Tempering temperature dependence of the hardness (RC), tensile strength (δ_β) and reduction of area (ψ) of air-cooled 40KhN steel wire conventionally hardened with furnace (1) or electrical (2) heating or hardened after two (3) or five (4) CHT cycles.

thermal decomposition of austenite at a lower temperature (450C) resulted in higher strength than decomposition of austenite at 650C, which can be explained by the coarser decomposition products. Higher mechanical properties obtained with two-cycle CHT of 40KhN steel can be explained by the martensite inhomogeneity associated with nonuniform distribution of carbon. Analogous high mechanical properties were obtained with high-temperature thermomechanical treatment of 40KhN steel. Similar

Card 2/3

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACC NR: AP6036406

results were obtained with CHT of St.40, St.60, 40Kh and 40KhNMo structural steels. Orig. art. has: 3 figures.

SUB CODE: 11/ SUBM DATE: 11Oct65/ ORIG REF: 005/ OTH REF: 001/ ATD PRESS: 5107

Card 3/3

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACC NR: AP6036407 (A,N) SOURCE CODE: UR/0148/66/000/011/0118/0122

AUTHOR: Kidin, I. N.; Lipchin, T. N.; Ryabov, Ye. S.

ORG: Moscow Institute for Steel and Alloys (Moskovskiy institut stali i splanov)

TITLE: Preliminary thermomechanical treatment of structural steels

SOURCE: IVUZ. Chernaya metallurgiya, no. 11, 1966, 118-122

TOPIC TAGS: structural steel, high strength steel, austenitic steel, thermomechanical treatment, steel strain hardening, strain hardening effect

ABSTRACT: Fully annealed low-alloy 40KhN (0.42% C, 1.02% Cr, 1.29% Ni) and 40KhNM (0.42% C, 1.05% Cr, 1.27% Ni, 0.27% Mo) steel wires were cold drawn with a reduction of 75% to a diameter of 2 mm, austenitized at 840C or 870—880C for 30 min in a vaccum furnace, water quenched and tempered at 100—400C for 1 hr. It was found that cold working after annealing and prior to hardening increased significantly the strength without lowering the ductility (see Fig. 1). Intermediate annealing of the cold drawn wire at 500C for 2 hr did not eliminate the strengthening effect of cold drawing. This effect was not eliminated even by high-temperature (850—900C) annealing 4 to 6 times followed by furnace or air cooling. Similar results were obtained with St.40, St.60, U8, U10 tool steels and 40Kh5 steel. The "inheritance" of the austen-

Card 1/2 UDC: 669.15—194 : 669.26'24'28 : 621.785

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

ACC NR: AP6036407

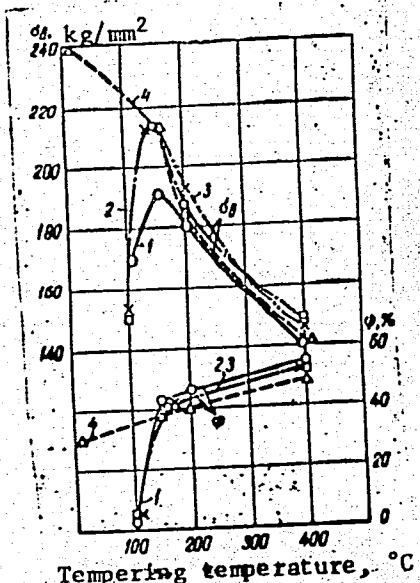

Fig. 1. Mechanical properties of 40KhN steel

ite defects by martensite can be explained by the unchanged position of closely located atoms during martensitic transformation, although the lattice geometry is wholly changed. Orig. art. has: 4 figures.

SUB CODE: 11/ SUBM DATE: 09Apr66/ ORIG REF: 006/ OTH REF: 001/ ATD PRESS: 5107

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

NADTOCHIY, V.M., inzh.; RYABOV, Ye.V., inzh.

Study of the banding units of turbogenerator rotors. Elek. sta. 36 no.6: 45-49 Je '65. (MIRA 18:7)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.

Training in the operation of lone military vehicles under conditions of poor visibility. No 5.

Tankist, No 12, 1948.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.

Training in the operation of military vehicles. No 12.

Tankist, No 12, 1948.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

BIRYUKOV, V.; RYABOV, Yu.

Eighteenth Session of the Scientific Council of the Joint Institute for Nuclear Research. Atom. energ. 19 no.4:404-406 O '65. (MIRA 18:11)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 13082-63 EWT(d)/FCC(w)/BDS AFFTC IJP(C)

ACCESSION NR: AP3003503 S/0020/63/151/001/0052/0054

AUTHOR: Ryabov, Yu. A. 52 51

TITLE: Some asymptotic properties of linear systems with a small delay in time 16

SOURCE: AN SSSR. Doklady*, v. 151, no. 1, 1963, 52-54

TOPIC TAGS: asymptotic properties, linear system, differential equation, continuous function, asymptotic solution

ABSTRACT: If the least upper bound of the delay h does not exceed a certain limit, then an asymptotic solution $x^*(t)$ of the equation - i.e.

$$\lim x(t) = \lim x^*(t)$$

corresponds to each solution $x(t)$ of the differential equation $dx(t)/dt = px(t) + qx(t-h)$, with p, q, h bounded piece-wise continuous functions.

Card 1/2/ Association: Moscow State University

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 13252-63 EWT(1)/BDS AFFTC/ASD

S/044/63/000/003/019/047

51

AUTHOR: Ryabov, Yu. A.

TITLE: Application of the small parameter method in the theory of nonlinear oscillations in the case of discontinuous characteristics of nonlinearity

21

PERIODICAL: Referativnyy Zhurnal, Matematika, no. 3, 1963, 48, Abstract 3B225 (tr. Vses. Zaochn. Energ. In-ta, no 16, 1960, 68-80).

TEXT: The author considers the system

$$\dot{x}_s = a_{s1}x_1 + \ldots + a_{sn}x_n + \omega_s(t) + \mu f_s(t, x_1, \ldots, x_n, \mu),$$
$$s = 1, 2, \ldots, n,$$

where f_s is a piecewise continuous function in $x_1, x_2, \ldots, x_n$ and periodic in t. The possibility of obtaining periodic solutions for this system by means of successive approximations is indicated.

[Abstracter's note: Complete translation.]

Card 1/1

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A. (Moskva)

A method for determining the regions of existence of periodic and almost periodic solutions to quasi-linear differential equations with small parameters and nonanalytic nonlinearity characteristics. Izv. vys. ucheb. zav.; mat. no.2:101-107 '63. (MIRA 16:3)
(Differential equations)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

L 13252-63 EWT(1)/BDS AFFTC/ASD

S/044/63/000/003/019/047

51

AUTHOR: Ryabov, Yu. A.

TITLE: Application of the small parameter method in the theory of nonlinear oscillations in the case of discontinuous characteristics of nonlinearity

21

PERIODICAL: Referativnyy Zhurnal, Matematika, no. 3, 1963, 48, Abstract 3B225 (tr. Vses. Zaochn. Energ. In-ta, no 16, 1960, 68-80).

TEXT: The author considers the system

$$\dot{x}_s = a_{s1}x_1 + \ldots + a_{sn}x_n + \omega_s(t) + \mu f_s(t, x_1, \ldots, x_n, \mu),$$
$$s = 1, 2, \ldots, n,$$

where f_s is a piecewise continuous function in $x_1, x_2, \ldots, x_n$ and periodic in t. The possibility of obtaining periodic solutions for this system by means of successive approximations is indicated.

[Abstracter's note: Complete translation.]

Card 1/1

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A.

A method for evaluating the region of convergence of periodic series representing solutions to quasi-linear differential equations with a small parameter. Izv.vys.ucheb.zav.; mat. no.6:108-118 '62. (MIRA 15:12)

1. Vsesoyuznyy zaochnyy energeticheskiy institut.
(Series) (Differential equations)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

USSR/Astronomy - Thru-Body Problem Sep/Oct 52

"Periodic Solutions Near 'Triangular' Libration Points of a Bounded Plane Circular Problem of Three Bodies," Yu. A. Ryabov, State Astr Inst imeni Shternberg

"Astron Zhur" Vol 29, No 5, pp 582-596

Applies Lagrange "triangular" soln of the problem of 3 bodies to the equilateral triangle formed by the sun, Jupiter, and one of the 14 asteroids named "Trojans." These approx solns permit an analytic theory of motion of asteroids. Solves the particular case

234T63

of 3 bodies on circular orbits lying in one plane by applying Lyapunov's method (cf. "General Problem of Stability of Motion," 1950).

RYABOV, YU. A.

234T63

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A.

Generalization of a theorem of A.M.Liapunov. Uch.zap.Mosk.un. 165:131-150 '54. (MIRA 8:2)
(Differential equations)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A

Subject : USSR/Astronomy

Card 1/2 Pub. 8 - 12/12

Authors : Arsent'yev, V. V. and Prodan, Yu.

Title : Chronicle Defense of Theses

Periodical : Astron. zhur., v. 31, 3, 302-304, My-Je 1954

Abstract : Three theses were presented, defended and awarded the degrees of Kandidat of Physico-Mathematical Sciences: 1) Kazachevskiy, V. M., junior collaborator of the Astro-Physical Institute of the Academy of Sciences, Kazakhstan SSR, presented a thesis on "Photometric determination of the reflecting capacity (albedo) of the terrestrial globe". His scientific sponsor was Academician V. G. Fesenkov. The opponent Prof. E. Ya. Bogoslavskaya gave a favorable appraisal. 2) Ryabov, Yu. A., Aspirant for the Chair of Celestial Mechanics, Moscow State University. The theme of his thesis was: "On the analytical theory of the motion of minor planets of the Trojan group". His scientific

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

Astron. zhur., v. 31, 3, 302-304, My-Je 1954

AID P - 382

Card 2/2 Pub. 8 - 12/12

sponsor was Prof. G. N. Duboshin. Criticized favorably by Prof. B. M. Shchigolev.

3) Shakirova, Kh. R., Aspirant for the Chair of Astronomy of the Physico-Mathematical Department of the Central-Asiatic State University. Her theme was: "Systematical errors in the watch errors observed in different hours of the night with a transit instrument". The scientific sponsor was Prof. V. P. Shcheglov, and the opponents wer Prof. K. A. Kulikov and Kandidat Phys.-Math. Sciences Ya. P. Goryelov.

Institution : State Astronomical Institute im. Shternberg

Submitted : No date

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yuriy Aleksandrovich; SAMSONENKO, L.V., redaktor; AKHLAMOV, S.N., tekhnicheskiy redaktor

[The movement of celestial bodies] Dvizheniia nebesnykh tel. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1956. 159 p. (MLRA 9:10)
(Mechanics, Celestial)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu. A.

VAUCOULEURS, Gerard de, 1918-; RYABOV, Yu.A.[translator]; SHARONOV, V.V., redaktor

[Physics of the planet Mars; an introduction to areophysics. Translated from the French] Fizika planety Mars; vvedenie v areofiziku. Perevod s frantsuzskogo IU. A. Riabova. Pod red. V.V. Sharonova. Moskva, Izd-vo inostrannoy lit-ry, 1956. 350 p. (MLRA 10:4)

(Mars (Planet))

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A.

Periodic solutions of differential equations containing a small parameter. Vest. Mosk. un. Ser. mat. mekh., astron., fiz., khim. 11 no.2:3-12 '56. (MIRA 10:12)

1. Kafedra nebesnoy mekhaniki Moskovskogo gosudarstvennogo universiteta.
(Differential equations) (Functions, Periodic)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A.

Developing a theoru of the motion of the Trojan planets based on their proximity to libration points [with summary in German]. Astron.zhur.33 no.6:936-952 N-D '56. (MLRA 10:1)

1. Gosudarstvennyy astronomicheskiy institut imeni P.K. Shternberga. (Planets, Minor)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu. A.

Ryabov, Yu. A. Complement to the article "Generalization of a theorem of A. M. Lyapunov." Moskov. Gos.

1-F\W

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

S. Lefschetz (Mexico City)

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S/044/60/000/012/001/014
C 111/ C 333

AUTHOR: Ryabov, Yu. A.

TITLE: On the theory of oscillations of quasilinear systems with several degrees of freedom and with nonanalytic characteristic of the nonlinearity

PERIODICAL: Referativnyy zhurnal, Matematika, no. 12, 1960, 73, abstract 13835. (Tr. Vses. zaochn. energ. in-ta, 1957, vyp. 11, 42-45)

TEXT: The author considers the equations $dx_s/dt = a_{s1}x_1 + \dots + a_{sn}x_n + \varepsilon X_s(t, x_1, \dots, x_n, \varepsilon)$, where a_{sk} are constants, X_s -- continuous in $x_1, \dots, x_n$, t and in ε, periodic in t and differentiable with respect to $x_1, \dots, x_n$. A new proof of the convergence of the successive approximations is given which, under absence of resonance, are used for constructing the periodic solutions. This proof is

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On the theory of oscillations ... S/044/60/000/012/001/014
C 111/ C 333

is obtained a method for the estimation from below of those values of ε for which the convergence of the considered successive approximations is guaranteed.

[Abstracter's note: Complete translation.]

Card 2/2

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

513

AUTHOR: Ryabov, Yu. A.

TITLE: Some methods of computing an intermediate orbit of asteroids of the Trojan group. (O nekotorykh sposobakh postroyeniya promezhutochnoy orbity dlya malykh planet troyanskoy gruppy. 1.)

PERIODICAL: "Astronomicheskiy Zhurnal" (Journal of Astronomy), 1957, Vol.34, No.2, pp. 276 - 297 (USSR).

ABSTRACT: A method for computing an intermediate orbit for the "Trojans" based on the application of the so-called singly averaged variant of the Delaunay-Hill problem is considered. Some essential characteristics of the intermediate orbit are investigated using integrals of this orbit. The results are compared with observational data for the Trojans. "Trojans" are considered as ordinary small planets which have no relation to the "triangular" points of libration but move round the sun in such a way that their mean motions are near to the mean motion of Jupiter. The limited elliptic three body problem and the associated equations are investigated in application to the osculating elements of the orbits of Trojans round the sun. The moment t_o = 1948, VII, 28.0 is taken as the initial moment in the solution of the intermediate orbit. First, the initial elements of Jupiter's orbit must be considered. Within the limits of the present

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Some methods of computing an intermediate orbit of asteroids of the Trojan group. (Cont.)

The calculated elements of the orbit are as follows:

$a' = 5.20279$, $i' = 1^\circ 18' 24''.9$,
$e' = 0.0489132$, $M'(t_0) = 315^\circ 49' 37''.2$,
$\omega' = -86^\circ 18' 28''.5$, $n' = 299''.1295 = 0^\circ.08309153$,
$\Omega' = 99^\circ 57' 44''.2$, $\lambda'(t_0) = 272^\circ 58' 44''.4$

Table 1 gives the values of the osculating elements of the 14 known "Trojans" (5). Tables 2 - 6 give these values for different epochs ($x = (a/a')-1$, $D = \lambda - \lambda'$). The values ω, Ω, i, are given for equinox and equator 1950.0. The semi-major axis of the planet No.588 had its highest value between 1907, V, 28.0 and 1924, XII, 11.0 and the Delaunay D anomaly was nearly 60°. For planets Nos. 884 and 1143, during the period covered by observations, D continued to increase in its absolute value but although it appeared to be near its extremum it had not in fact reached it by 1948, VII, 28.0. The semi-major axis of the osculating orbit of the planet No.1173 had its smallest value between 1940, VIII, 25.0 and 1948, VII, 28.0 while the Delaunay D anomaly was nearly 60°. The calculated extremal values of a_* and D_* are not in disagreement with the observed values (a,D). For one of the planets (No.884) the calculation of the intermediate orbit was carried out completely. The formulae and calculated data are given on p.296 and in

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problem (limited elliptical problem of three bodies) it is assumed that Jupiter moves in an unperturbed elliptic orbit. However, as is known, the motion of Jupiter is not really of this kind because of the presence of perturbations due to the other planets of the solar system. One has, in fact, an osculating elliptic orbit whose elements do change with time, but very slowly. Neglecting the changes in the osculation elements of Jupiter's orbit one should obtain the values of these elements at any moment of time. The values of osculating elements of Jupiter's orbit were calculated assuming that the heliocentric rectangular (equatorial) coordinates of Jupiter were:

$$\left.\begin{aligned} X_1 &= 2.8794387 \\ Y_1 &= -3.8447716 \\ Z_1 &= -1.7198351 \end{aligned}\right\} \quad \text{at } t_1 = 1949,\ X,\ 11.0$$

$$\left.\begin{aligned} X_2 &= 4.1367020 \\ Y_2 &= -2.5863121 \\ Z_2 &= -1.2106886 \end{aligned}\right\} \quad \text{at } t_2 = 1950,\ V1,\ 80$$

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Table 8 where a_H, e_H, $\bar{\omega}_H$, M_H, i_H, Ω_H and D_H are observed values and a_x, e_x, $\bar{\omega}_x$, M_x, i_x, Ω_x, D, and $D^{(0)}$ are calculated. Further work is being carried out. This will lead to a better agreement with observations. 8 tables, 7 figures, 5 references, 3 of which are Russian.

State Astronomy Institute
imeni P. K. Shternberg.

Recd. April 19,1956.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, YU. A.

AUTHOR: Ryabov, Yu. 33-3-29/32

TITLE: The motion of celestial bodies. (Dvizhenie nebesnykh tel.) Gostekhizdat, Moscow, 1956, 159 pages. Reviewed by K.A. Kulikov.

PERIODICAL: "Astronomicheskiy Zhurnal" (Journal of Astronomy), 1957, Vol.34, No.3, pp. 499-500 (U.S.S.R.)

ABSTRACT: The popular account by Yu.A. Ryabov fills a gap in the Soviet popular scientific literature and should be welcomed. Many interesting questions are treated in this book in a popular way, for example, the motion of cosmic bodies, which is particularly important now in connection with the proposed artificial satellite, and also interplanetary travel. The following topics are treated in a qualitative way: the law of gravitation, the concept of perturbed motion, the theory of motion of heavenly bodies, and the nature of gravitation. The book is interesting, and in the opinion of the reviewer much needed. There are some mistakes and misprints and these are now listed.

SUBMITTED: February, 24, 1957.

AVAILABLE: Library of Congress

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

33-4-8/19

On some methods of construction of an intermediate orbit for slow planets of the Trojan group.

ASSOCIATION: Shternberg State Astronomical Institute, (Gos.Astronomicheskiy In-T im. P. K. Shternberga)

AVAILABLE: Library of Congress

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu. A.

3(1) PHASE I BOOK EXPLOITATION SOV/1840

Vsesoyuznoye astronomo-geodezicheskoye obshchestvo

Astronomicheskiy kalendar; yezhegodnik. Peremennaya chast'; 1959 (Astronomical Calendar; Yearbook. Variable Part; 1959) Moscow, Fizmatgiz, 1958. 370 p. 8,500 copies printed.

Ed.: I.Ye. Rakhlin; Tech. Ed.: S.N. Akhlamov; Editorial Board: P.I. Bakulin (Resp. ed.), S.G. Kulagin, A.G. Masevich, and P.P. Parenago.

PURPOSE: This astronomical calendar is intended for specialists in astronomy, astrophysics, and geophysics.

COVERAGE: The book is divided into two parts. The first, based on data taken from the USSR Astronomical Yearbook for 1959, consists of ephemerides and accompanying text, compiled and written by the following specialists: S.G. Kulagin and L.D. Kovbasyuk of the GAGO (State Astronomical and Geodetical Society) - notes on ephemerides, the ephemerides of the Sun and Moon; M.M. Dogayev of the MOVAGO (Moscow Branch of the All-Union Astronomical and Geodetic Society) - text and maps of the visible trajectories of the planets, text and maps of eclipses, the physical coordinates

Card 1/10

of the Sun, Moon, Mars, and Jupiter, the satellites of Jupiter and Saturn; N.D. Rozenblyum (MOVAGO) - ephemerides and heliocentric longitudes of planets; I.P. Yegorchenko, A.A. Kaverin, T.G. Konstantinova, V.A. Kuklina, G.V. Kuklin, Z.G. Sazonova, L.I. Chernykh, and N.S. Chernykh - data on 144 points in the USSR for the full solar eclipse of October 2, 1959; Ye.G. Demidovich (GAGO) - occultation of the stars and planets by the Moon, observation of the Polar Star, computation of stellar coordinates; V.A. Bronshteyn (MOVAGO) - comets; N.S. Yakhontova - the lesser planets; and, N.B. Perova (MOVAGO) - variable stars. The second part, the Supplement, contains a review of the achievements in astronomy for the years 1956 and 1957, written by V.A. Bronshteyn, O.D. Dokuchayeva, L.A. Katasev, M.A. Klyakotko, P.P. Parenago, and I.S. Shcherbina-Samoylova under the editorship of A.G. Masevich, articles on artificial satellites, the danger in astronautics from meteors, the nature of galaxies, articles on scientific meetings held in the Soviet Union and abroad, and articles on the anniversaries of events in astronomy. The book is profusely illustrated with tables, maps, photographs, and diagrams. The Supplement includes some 125 Soviet references grouped according to subject matter and type of publication.

Card 2/10

Astronomical Calendar; Yearbook. Variable Part; 1959 SOV/1840

Joint Visiting Session of the Astronomical Council of the AN SSSR and the Academy of Sciences of the Azerbaydzhan SSR (M.A. Klyaketko) 271

This article treats the meeting at which M.M. Aliyev, A.A. Nikhaylov, A.A. Yakovkin, S.K. Vsekhsvyatskiy, V.V. Sharonov, V.P. Shcheglov, Z.I. Khalilov, V.A. Mirat, and G.P. Sultanov participated.

The 350th Anniversary of the Formulation of Keppler's First Two Laws (Yu.A. Ryabov) 275

This article is a historical account and discussion of Keppler's first two Laws.

The 85th Anniversary of the Tashkent Astronomical Observatory (V.P. Shcglov) 286

The article provides a detailed historical account and description of the Tashkent Astronomical Observatory of the Academy of Sciences of the Uzbek SSR, the oldest scientific research institution in Central Asia. The Observatory

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

AUTHOR: Ryabov, Yu.A. 20-118-4-5/61

TITLE: Estimation of the Region of Convergence of the Periodic Series Representing Solutions of Differential Equations With a Small Parameter (Otsenka oblasti skhodimosti periodicheskikh ryadov - resheniy differentsial'nykh uravneniy s malym parametrom)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 118, Nr 4, pp 642-645 (USSR)

ABSTRACT: The periodic solutions of the system

$$\frac{dx_s}{dt} = a_{s1}x_1 + \dots + a_{sn}x_n + \mu\varphi_s + X_s \qquad s=1,\dots,n$$

are usually (under the usual assumptions) sought as power series in μ, the coefficients of which are periodic functions:

$$x_s = \mu x_s^{(1)} + \mu^2 x_s^{(2)} + \dots . \tag{1}$$

The author investigates the region of convergence of the series $x_s^{(j)}$. He succeeds in obtaining algebraic equations, the solutions u_s of which are sought as series

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yuriy Aleksandrovich

Celestial Mechanics. Moscow, Foreign Languages Publishing House, 1959.

164 p. Diagrs., Graphs, Tables.

Translated from the original Russian: Dvizheniya Nebesnykh Tel, Moscow, 1956.

Bibliographical Footnotes.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

16(1) SOV/140-59-2-21/30

AUTHOR: Ryabov, Yu.A.

TITLE: The Estimation of the Region of Convergence of Periodic Series Being Solutions of Differential Equations With a Small Parameter. The Case of Missing Resonance (Otsenka oblasti skhodimosti periodicheskikh ryadov - resheniy differentsial'nykh uravneniy s malym parametrom. Sluchay otsutstviya rezonansa)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1959, Nr 2, pp 202-212 (USSR)

ABSTRACT: The results of the present paper are already announced in [Ref 7]. The author mentions A.M.Lyapunov. There are 10 references, 8 of which are Soviet, and 2 American.

ASSOCIATION: Moskovskiy Vsesoyuznyy zaochnyy energeticheskiy institut (Moscow All-Union Correspondence Institute of Power Engineering)

SUBMITTED: June 7, 1959

Card 1/1

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

3(1) SOV/26-59-8-2/51

AUTHOR: Ryabov, Yu. A., Candidate of Physical and Mathematical Sciences (Moscow)

TITLE: The Laws of Motion of Artificial Celestial Bodies

PERIODICAL: Priroda, 1959, Nr 8, pp 11-18 (USSR)

ABSTRACT: On 4 October 1957, the first Soviet artificial earth satellite was sent into cosmic space. It was followed by the second sputnik on 3 November 1957 and by the third on 15 May 1958. The first cosmic rocket of the USSR started on 2 January 1959 and since this date can be called a small planet of the solar system. The author tries to give an answer to the questions: how a rocket has to be sent into cosmic space, so that it will act as an artificial celestial body, what can be said about the orbit of these planets, and under which circumstances the artificial planet will return to the earth. The author states that sputnik has to reach a minimum altitude of more than 150 km before starting

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

SOV/26-59-8-2/51

The Laws of Motion of Artificial Celestial Bodies

into its orbit. The speed of the sputnik must guarantee this height. According to the author, the first sputnik reached an altitude of approximately 228 km before its entrance into the orbit (the second and third sputnik recorded a height of 224-225 km), and its speed amounted to 7,973 m per second (the second and the third recorded a speed of 8150-8197 m per second). For the cosmic rocket, the minimum initial velocity is 72.3 km per second. The author demonstrates the flight of the Soviet rocket (with an aggregate weight of 361.3 kg for the container and the scientific apparatus) by means of 3 graphs (Figure 3-5). He states that the rocket first moved in a hyperbolic orbit and later on, when at a distance of about 900,000 km from the earth, in an elliptic orbit around the sun. A greatly simplified method of calculation, based on Newton's law, of the motion of two bodies attracting each other is outlined in the text.

Card 2/3

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

SOV/26-59-8-2/51

The Laws of Motion of Artificial Celestial Bodies

There are 5 graphs and 2 references, 1 of which is Soviet and 1 English.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

S/103/60/021/06/05/016
B012/B054

AUTHOR: Ryabov, Yu. A. (Moscow)

TITLE: Application of the Method of the Small Parameter to Investigate Automatic Control Systems With Delay

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol. 21, No. 6, pp. 729 - 739

TEXT: The author describes a method of investigating automatic control systems with delay. It is based on the use of delay as a small parameter, and on the use of the method of the small parameter by Lyapunov-Poincare. The author investigates linear equations with constant coefficients and constant delay. In the general case, these equations have the form of formula (1) the solution of which is given in the form of a series - formula (5). It is shown that with $\mu < \mu_0$ the sum of this series represents a function of t, and that formula (1) can be solved in any case if μ is sufficiently small. This solution is determined for all values of $-\infty < t < \infty$, has continuous derivations of any order for every point, and

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satisfies the given initial conditions $x_s(0) = x_{so}$. μ is the constant delay. It is pointed out that, according to the general theory of differential equations with delay, the solution of system (1) depends not only on the initial values x_{so} of the desired functions at the instant $t=0$ but also on the so-called initial functions $\varphi_1, \ldots, \varphi_n$. It is assumed that the functions $x_1, \ldots, x_n$ be equal to the initial functions in the range $-\mu \leq t < 0$. These initial functions express the so-called "previous history" or "heredity" of the dynamic system investigated, which is described by formula (1). The method described, however, allows a unique solution even if only the initial values x_{so} are given. This solution shows no "hereditary" characteristics, and is only one special solution of system (1) among the great number of solutions determined by the same initial conditions but different initial functions. In this connection, the author raises the question as to the position of this solution among the other solutions of system (1). It is shown that in equations with

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

Application of the Method of the Small Parameter to Investigate Automatic Control Systems With Delay

S/103/60/021/06/05/016
B012/B054

sufficiently small delay of a certain type a so-called relaxation of "heredity" occurs, i.e., a reduction of its influence with time. In this connection, the author studies the question as to whether this also applies to more complicated systems of equations with delay. It is shown that a so-called conditional stability exists in the zero solution of system (1) with sufficiently small μ as well as with $\mu=0$. As an example, the author investigates the system of equations (10) for the stabilization of a rocket according to the angle of slope γ by means of the autopilot with rigid feedback and a delay μ in the argument of the parameter of the control mechanism. Formula (19) is derived, which gives approximately the limit of delays at which the stability of the control process seems guaranteed. A paper by A. D. Myshkis (Ref. 4) is mentioned. A. M. Letov advised the author. There are 1 figure and 5 references: 4 Soviet and 1 English.

Card 3/3

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

Ryabov, Yu. A.

S/020/60/133/02/10/068
C111/C222

AUTHOR: Ryabov, Yu.A.

TITLE: Use of the Small Parameter Method in the Construction of Solutions to Differential Equations With a Lagging Argument

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 2, pp.288-291

TEXT: The author proposes a method which permits to obtain the solution of an ordinary differential equation with a lagging argument by interpreting the lagging as a small parameter. Then the solutions are sought by successive approximations as in (Ref. 1) by I.G. Malkin, where the zero approximation is the solution of the equation without a lagging. The k-th approximation distinguishes from the (k-1)-st approximation by terms of k-th order with respect to the lagging. The method can be applied only to very simple equations. There are 3 Soviet references.

PRESENTED: March 11, 1960, by I.G. Petrovskiy, Academician

SUBMITTED: March 3, 1960

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RYABOV, YU. A.

"On the evaluation of the applicability limits for the small parameter method in the theory of nonlinear oscillations."

Paper presented at the Intl. Symposium on Nonlinear Vibrations, Kiev, USSR, 9-19 Sep 61

Institute of Astronomy, Moscow State University, Moscow

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AUTHOR: Ryabov, Yu. A.

TITLE: On a method for the estimation of the domain of application of the method of the small parameter in the theory of non-linear oscillations .

PERIODICAL: Referativnyy zhurnal, Matematika, no. 4, 1962, 38, 39, abstract 4B171. (Inzhenernyy zh. (formerly Inzhenernyy sb.), 1961, 1, no. 1, 16 - 28)

TEXT: Considered is the system of differential equations

$$\dot{x}_s = a_{s1}x_1 + \ldots + a_{sn}x_n + \mu f_s(t, x_1, \ldots, x_n, \mu)$$

$$(s = 1, \ldots, n) \qquad (1)$$

where $a_{s\sigma}$ are constant coefficients, while the f_s are continuous with respect to t, x, μ in the domain $D(|x_s| < A, -\infty < t < \infty, \mu < Q)$, 2π-periodic with respect to t and possessing bounded derivatives of first order with respect to x. Let the characteristic equation $|a_{s\sigma} - E\lambda| = 0$ have no purely imaginary or zero roots. Then the periodic solution of the system (1) is determined by successive

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approximations according to the scheme

$$x_s^{(k)} = a_{s1}x_1^{(k)} + \ldots + a_{sn}x_n^{(k)} + \mu f_s(t, x_1^{(k-1)}, \ldots, x_n^{(k-1)}, \mu), \qquad (2)$$

$x_s^{(0)} = 0$ $(s = 1, \ldots, n)$. Thereby $|x_s^{(k)}(t)| \leq \mu \sum_{\sigma=1}^{n} N_{s\sigma} M_\sigma$, $N_{s\sigma}$ being certain constants, while $M_\sigma = \sup |f_\sigma(t, x_1^{(k-1)}, \ldots, x_n^{(k-1)}, \mu)$ for $0 \leq t \leq 2\pi$.

It be possible to find functions $\bar{\Phi}$ such that

$$\bar{\Phi}_s(u_1, \ldots, u_n, \mu) \geq |f_s(t, x_1, \ldots, x_n, \mu)|,$$

$$\frac{\partial \bar{\Phi}_s}{\partial u_\sigma}(u_1, \ldots, u_n, \mu) \geq \left| \frac{\partial f_s}{\partial x_\sigma} \right|,$$

if $u_s \geq |x_s|$ and $x_s \in D$. Then $u_s = u_s(t)$ are defined as the solution of the system

$$u_s = \mu \sum_{\sigma=1}^{n} N_{s\sigma} \bar{\Phi}_\sigma(u_1, \ldots, u_n, \mu) \quad (s = 1, \ldots, n);$$

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for $u_s(t)$ one constructs the successive approximations

$$u_s^{(k)} = \mu \sum_{\sigma=1}^{n} N_{s\sigma} \Phi_\sigma(u_1^{(k-1)}, \ldots, u_n^{(k-1)}, \mu) \quad (s = 1, \ldots, n).$$

The sequence $u_s^{(k)}$ converges, if $\mu \leq \bar{\mu}$, $\bar{\mu}$ being determined by the equation system

$$F_s \equiv u_s - \mu \sum_{\sigma=1}^{n} N_{s\sigma} \Phi_\sigma(u_1, \ldots, u_n, \mu) = 0,$$

$$\frac{D(F_1, \ldots, F_n)}{D(u_1, \ldots, u_n)} = 0.$$

One states that for $\mu \leq \bar{\mu}$ also the sequence $x_s^{(k)}$ converges, while the error of on arbitrary approximation $|x_s^{(k)} - x_s|$ is majorised by the differences $u_s - u_s^{(k)}$. By a series of examples one gives methods for the improvement of the majorising equations and of the number $\bar{\mu}$ for

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On a method for the estimation...

the purpose of the approximation of $\bar{\mu}$ to the true convergence radius of the successive approximations (2). The case of existing purely imaginary and zero roots is investigated by the example of the equation $\dot{x} = \lambda x + \mu f(t, x, \mu)$.

[Abstracter's note: Complete translation.]

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RYABOV, Yu.A. (Moskva)

Applying the Liapunov-Poincare small parameter method in the theory of delay systems. Inzh.zhur. 1 no.2:3-15 '61. (MIRA 14:12)
(Differential equations, Linear)

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yu.A. (Moskva)

Evaluating the applicability of the minor parameter method to problems in the theory of nonlinear vibrations. Inzh.zhur.1 no.3: 3-21 '61. (MIRA 15:2)

(Vibration)

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001446310014-7

RYABOV, Yuriy Aleksandrovich; REZNIKOVSKIY, P.T., red.; MURASHOVA, N.Ya., tekhn. red.

[Motions of celestial bodies] Dvizheniia nebesnykh tel. Izd.2., dop. Moskva, Gos. izd-vo fiziko-matem. lit-ry, 1962. 215 p. (MIRA 15:4)

(Mechanics, Celestial)

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ASTAPOVICH,I.S.; BAKULIN,P.I.; BAKHANEV,A.M.; BRONSHTEN,V.A.; BUGOSLAVSKAYA, N.Ya.[deceased]; VASIL'YEV,O.B.; GRISHIN,N.I.; DAGAYEV, [illegible]; [illegible]; DUBROVSKIY,K.K.[deceased]; ZAKHAROV,G.P.; ZOTKIN,I.T.; KRAMER,Ye.N.; KRINOV,Ye.L.; KULIKOVSKIY,P.G.; KUNITSKIY,R.V.; KUROCHKIN,N.Ye.; ORLOV,S.V.[deceased]; POPOV,P.I.; PUSHKOV, N.V.; RYBAKOV, A.I.; RYABOV,Yu.A.; SYTINSKAYA, N.N.; TSESEVICH, V.P.; SHCHIGOLEV,B.M.; VORONTSOV-VEL'YAMINOV,B.A.,red.; POMOMAREVA,G.A., red.; KRYUCHKOVA, V.N., tekhn. red.

[Astronomical calender; permanent part] Astronomicheskii kalendar'; postoiannaia chast'. Izd.5., polnost'iu perer. Otv. red. P.I.Bakulin. Red.kol.V.A.Bronshten i dr. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1962. 771 p. (MIRA 15:4)

(Astronomy—Yearbooks)

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ACCESSION NR: AR3005367 S/0044/63/000/006/B045/B046

SOURCE: RZh. Matematika, Abs. 6B218

54

AUTHOR: Ryabov, Yu. A.

TITLE: The small-parameter method in the theory of periodic solutions of differential equations with a lagging argument

CITED SOURCE: Tr. seminara po teorii differents. uravneniy s otklonyayushchimsya argumentom. Un-t druzhby narodov im. Patrisa Lumumby, v. 1, 1962, 103-113

TOPIC TAGS: differential equation, parametric solution, Lyapunov construction, majorant equation, lag

TRANSLATION: The author considers the equation

$$\dot{x}(t) = f(x(t), x(t-h), t) \quad (-\infty < t < \infty,\ h = \text{const})$$

where the right-hand side is periodic with respect to t with a period 2π and satisfies certain smoothness conditions. Let the equation have a periodic solution $\psi(t)$ with $h = 0$; the corresponding equation in variations has a characteristic index different from zero. Then even with sufficiently small $h > 0$ the equation

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has a periodic solution $x^*(t)$ which goes to $\psi(t)$ for $h = 0$. This solution is constructed with the aid of successive approximations whose convergence is proved by constructing majorant functional equations by the Lyapunov method. It is likewise proved that if $\psi(t)$ is asymptotically stable in the first approximation with $h = 0$, then $x^*(t)$ has the same property. A similar theorem holds for systems of equations of this form with several lags. As an example, there is a detailed analysis of the equation. $\dot{x}(t) = x(t) + [1 + (\sin t + \cos t)/5]\, x^3(t-h)$.

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S/140/62/000/006/003/006
E031/E435

AUTHOR: Ryabov, Yu.A.

TITLE: On a method of estimating the domain of convergence of periodic series which are the solutions of quasilinear differential equations containing a small parameter. The resonance case

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika. no.6, 1962, 108-118

TEXT: It is assumed that the solution of a set of equations of the form $\dot{x} = Ax + \mu X$ (where x and X are column vectors, X having series expansion in powers of the x's, A is a constant matrix and μ is a small parameter) can be expanded in powers of μ in which the coefficients are periodic functions of time with the period 2π. The question arises of finding the lower bound of μ such that all the series converge. In the resonance case considered the matrix A has a number of roots which are integral multiples of $\sqrt{-1}$. Assuming a particular expansion for X the conditions that the coefficients of the powers of μ in the assumed solution are periodic are determined. Functional

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