SOROKOPUDOVA, V.G.; ADLERBERG, M.M.; LEVIN, A.N.

Studying the continuous process of the production of condensed raw urea and melamine-formaldehyde resins modified with butanol. Lakokras.mat. i ikh prim. no.2:59-64 '64. (MIRA 17:4)

DEMKIN, V.M.; IVANOV, P.S.; LEVIN, A.N.

Continuous process for the production of novolak phenol-formaldehyde resins. Plast.massy no.4:14-20 '64. (MIRA 17:4)

GDALIN, S.I., inzh.; LEVIN, A.N., doktor tekhn. nauk, prof.

Extruder for producing foam polystyrene. Khim. i neft. mashinostr. no.5:12-14 N '64 (MIRA 18:2)

S/0191/64/000/005/0033/0038

ACCESSION NR: AP4035104

AUTHOR: Sukhov, S. I.; Levin, A. M.

TITLE: Fiberglass clad with chemically stable thermoplastics. Methods of preparing and technology of manufacturing chemical apparatus

SOURCE: Plasticheskiye massy*, no. 5, 1964, 33-38

TOPIC TAGS: chemical apparatus, manufacture, thermoplastic clad fiberglass, chemically stable fiberglass construction, polyester fiberglass thermoplastic lamina, plastic cladding, machine construction, hermetic fiberglass, polyethylene clad fiberglass, polypropylene clad fiberglass, polyvinyl chloride clad fiberglass, fluoroplastic clad fiberglass, glass-reinforced plastic laminate, hermetic glass-reinforced plastic

ABSTRACT: Work was done on preparing lamellar compositions based on polyester glass-reinforced plastic and chemically resistant thermoplastics which may be applied in chemical apparatus and machine construction. The limited chemical stability and low hermetic state of fiberglass may be overcome by cladding with materials such as low- or high-density polyethylene, polypropylene, polyvinyl chloride, vinyl, or fluoroplastics. Cladding conditions and methods for forming

Card 1/2

ACCESSION NR: AP4035104

articles and joining them and for reinforcing the fiberglass were investigated. The fused thermoplastic is pressed onto the glass fabric base and subsequently reinforced from the base side by glass fiber materials impregnated with binders. The thermoplastics are heated to 20--40C above their fusion temperature, held for 2--5 min at pressures of 3.5--20 kgs/cm^2 and cooled to 20--30C. Fluoroplastic 1--1.5 mm thick and 2--2.5-mm layers of the other thermoplastics provide hermetic sealing. Lamellar fiberglass clad on one or both sides or internally, linings, and pipes can thus be prepared. Apparatus which can resist aggressive media while operated at elevated temperatures under pressure or vacuum can be constructed. The favorable properties of the glass reinforced plastic and of the thermoplastics are thus combined. Orig. art. has: 9 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MT

NO REF SOV: 013 OTHER: 004

Card 2/2

KIM, V.S.; LEVIN, A.N.

Design of extrusion dies for flat sheets with resistance equal to that of the collector. Plast.massy no.4:50-54 '64. (MIRA 17:4)

L 25267-65 EWG(j)/EWP(e)/EWT(m)/EPF(c)/EWP(v)/EPR/EWP(j)/T/EWP(b) Pc-4/Pr-4/
Ps-4 WW/DJ/RM/WH

ACCESSION NR: AT5000537 S/3078/64/027/000/0195/0200

AUTHOR: Makhmudov, D.S.; Levin, A.N.

TITLE: The effect of impurities on the antifrictional properties of polycaprolactan "V" and its adhesion to metal

SOURCE: Moscow. Institut khimicheskogo mashinostroyeniya. Trudy, v. 27, 1964. Mashiny dlya pererabotki polimerny kh materialov (Machinery for the processing of polymeric materials), 194-200

TOPIC TAGS: polycaprolactam, polycaprolactam wear resistance, polycaprolactam adhesion, plastic adhesion, antifriction material, solid lubricant, bearing friction, aluminum powder, graphite, molybdenum disulfide, coated steel, talc

ABSTRACT: To determine the optimal combination of characteristics necessary for plastic replacement of parts in high-friction positions, i.e.: low heat conductivity, high coefficient of thermal decomposition, low thermostability, good absorptive qualities, and various interrelated properties, polycaprolactam was tested on an MI-type "friction" machine for antifriction and adhesive properties (see Fig. 1 of the Enclosure). Pins 40 mm in diameter and 10 mm thick made of steel 45 were covered with a 3-5 mm coating

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3

L 25267-65

ACCESSION NR: AT5000537

of polycaprolactam, a thermoplastic polymer with a molecular weight of 15,000-30,000. This compound has simultaneously existing crystalline and amorphous states, which, under the proper conditions, give it a high benzene and oil stability. Samples with admixtures of aluminum powder, 3 and 5% by wt., talc, 5 to 20% by wt., graphite, 5 to 30% by wt., and molybdenum disulfide were tested. Coatings of polycaprolactam over the surface of metal bearings yielded a stable antifrictional layer. The surface of the ball touching the bearing covered with polymer showed almost no wear during the experimental period. This system may easily be adapted to both small and large-scale operations. Losses due to wear become nearly negligible. The process is economical, particularly in heavy industry, and necessitates no specially-skilled workers. Addition of aluminum powder, talc, graphite, and particularly molybdenum disulfide enhances the antifrictional and physicomechanical properties of polycaprolactam coatings. Orig. art. has: 2 figures and 2 photographs.

ASSOCIATION: Institut Khimicheskogo mashinostroyeniya, Moscow (Chemical machine building institute)

SUBMITTED: 00 ENCL: 01 SUB CODE: MT

NO REF SOV: 003 OTHER: 000

2/3

Card

25267-65

ACCESSION NR: AT5000537

ENCLOSURE: 01

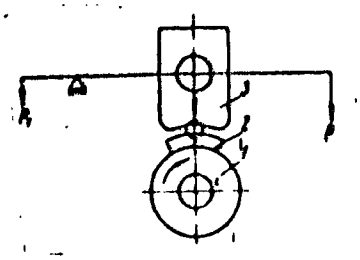

Fig. 1. Schematic diagram of the load on the rubbing parts: 1. the pin, resembling an axle; 2. the sector with the antifrictional surface; 3. capron plate with in-mounted ball bearing. (P-changeable weight, P_1 - counter-balance weight.)

Card 3/3

LEVIN, A.N.; POPOV, A.V.

Use of plastics in the friction units of rubber processing rolls. Kauch. i rez. 23 no.10:36-40 O '64. (MIRA 18:2)

1. Volzhskiy filial nauchno-issledovatel'skogo instituta rezinovoy promyshlennosti.

GDALIN, S.I., inzh.; LEVIN, A.N., doktor tekhn.nauk

Efficiency of an extruder in the processing of plastic foam.
Khim. i neft. machinostr. no.2:10-14 F '65.
(MIRA 18:4)

KAPLUN, Ya.B.; LEVIN, A.N.

Taking into account the elastic aftereffect in designing a molding tool for the extrusion of thermoplastics. Plast. massy no.2:46-51 '65. (MIRA 18:7)

KORETSKIY, I.M.; LEVIN, A.N.; SHERYSHEV, A.A.

Equipment for manufacturing plastics products. Plast. massy no.3:1-3 '65. (MIRA 18:6)

KIM, V.S.; LEVIN, A.N.

Studying the anisotropy of the mechanical properties of plates made from thermoplastic resins during extrusion. Plast. massy no.3:48-52 '65. (MIRA 18:6)

L 53652-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pt-4

ACCESSION NR: AP5013360 UR/0314/65/000/005/0004/0008

AUTHORS: Sukhov, S. I. (Engineer); Levin, A. N. (Doctor of technical sciences) 66.023.025:621.771.8:667.7

TITLE: Chemical equipment made of biplastics

SOURCE: Khimicheskoye i neftyanoye mashinostroyeniye, no. 5, 1965, 4-8

TOPIC TAGS: chemical industry, equipment reliability, plastic compound, plastic coating, plastic industry, welding technology, welding heat treatment, plastic material, plastic shell structure, plastic strength, plastic technology, plastics machining, vinyl plastic, fiberglass, fiberboard, fiberglass pipe/PN 1 fiberglass, TZhS 0.85 fiberglass

ABSTRACT: New structural materials called "biplastics" were obtained by coating fiberglass with thermally and chemically stable plastics. Chemical containers of this material have a capacity from 5 liters to many cubic meters. They are of different shapes and have such features as lids, doors, connecting pipes, flanges, observation windows, etc. Various biplastic items were made of PN-1 coating on TZhS-0.85 fiberglass. Their design and the assembly of different sections are discussed. Special attention is paid to the seams and the separable connections. Rigid joints are obtained by welding with thermoplastic rods. The

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L 53652-65
ACCESSION NR: AP5013360

joints are reinforced by strips of the same or of different material. Good results were obtained by air welding without the plastic rods. In this process the overlapping edges were melted, pressed togother, and rolled. Doors and sleeves were connected to the main body in three steps: they were fixed by the plastic rod welding, heat-welded to the plating layer, and the area of connections was covered by a fiberglass layer for reinforcement. Separable connections consisted of plastics or of plastic-metal combinations. The connections and the equipment details could be made of any strength or rigidity required. Chemical stability and air-tightness of the equipment depended on the kind of plastic used for plating while its strength and hardness varied with the composition of fiberglass and the method of molding the reinforcement shell. Tests showed that biplastic equipment may successfully replace that made of high alloyed steel, alloys, nonferrous metals, and other plastics. Its cost is 6-10 times lower than that of the titanium apparatus, 2-3 times lower than stainless steel, and 2-2.5 times lower than vinyl and faolite. The biplastic equipment is 2.5-4 times lighter than similar steel items and 4.5-6 times lighter than brass and copper items. Orig. art. has: 5 figures.

ASSOCIATION: none
SUBMITTED: 00 ENCL: 00 SUB CODE: IE, MT
NO REF SOV: 001 OTHER: 000
Card 2/2

OSIPOV, V.A.; LEVIN, A.N.

Effect of the volatile matter and moisture content of fibrous compression molding materials on their casting properties and the physicomechanical and dielectric properties of the manufactured products. Trudy MIKhM 27:48-53 '64.

(MIRA 18:8)

BALASHOV, M.M.; LEVIN, A.N.

Design of single-screw extruders for the processing of thermoplastics. Trudy MIKHM 27:89-97 '64.

(MIRA 18:8)

SINDEYEV, A.A.; ILYIN, A.N.

Studying some problems of the granulation of thermoplastics. Trudy MIKHM 27:201-210 '64. (MIRA 18:8)

LEVIN, A.N.

Determining the dependence of the absorption coefficient on the frequency of elastic vibrations for soils. Prikl. geofiz. no.38:53-57 '64.

(MIRA 18:11)

L 29252-66 EWP(j)/EWT(m) RM/WW/JW

ACC NR: AP6019314 SOURCE CODE: UR/0286/65/000/012/0022/0022

34
B

INVENTOR: Levin, A. M.; Glazov, A. N.; Vershinin, V. I.; Danilov, P. M.; Plekhanov, P. S.; Pashchenko, V. Ye.; Lachinov, S. S.; Kuznetsov, L. D.; Rabina, P. D.; Levitskaya, T. T.; Tatarov, F. S.; Lipinskaya, V. P.; Cherneyeva, Z. M.; Alekseyeva, Z. S.

ORG: none

TITLE: Steel for manufacturing ammonia synthesis catalyzer. Class 18, No. 171877

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 12, 1965, 22

TOPIC TAGS: steel, ammonia, inorganic synthesis, catalysis

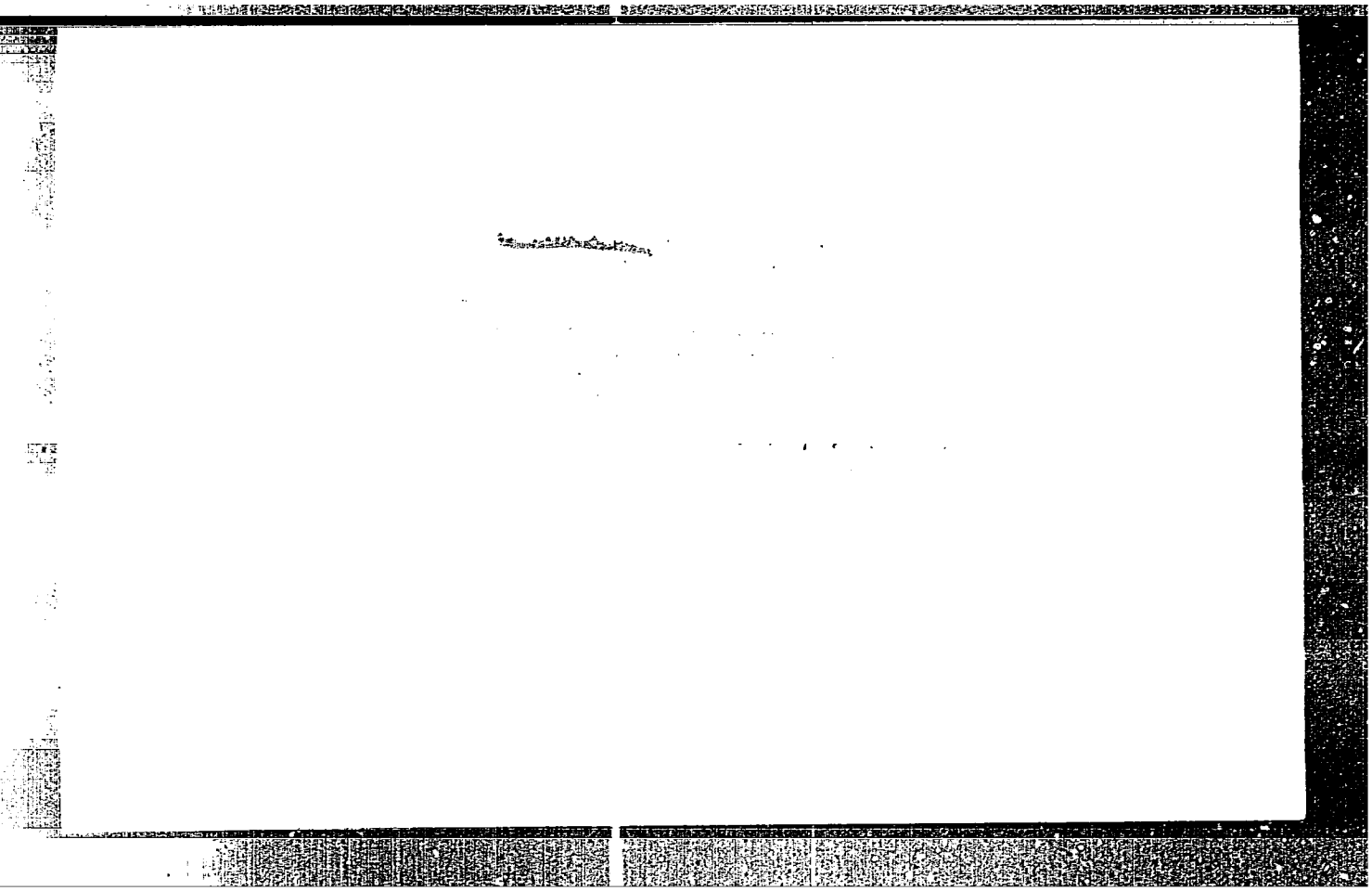
ABSTRACT: A steel for manufacturing ammonia synthesis catalyzers is distinguished by an increased catalyzer activity and has the following chemical composition: 0.10% C, 1.0-2.0% Al, 0.05% Mn, 0.008% P, 0.008% S, 0.05% Cr, 0.10% Cu, 0.05% Ni, 0.40% Si, balance--iron. [JPRS]

SUB CODE: 11, 07 / SUBM DATE: none

Card 1/1 UDC: 669.14/15

SINEYEV, A.A.; LEVIN, A.N. [deceased]

Pressure losses in the round channels of a granulator head during a steady isothermal flow of melted compositions for phonograph records. Plast. massy. no.9:44-48 '65.
(MIRA 18:9)



APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929520003-1"

KOLESOV, V.I., prof. (Leningrad P-46, ul. Kuybysheva, d.5, kv.3); LEVIN, A.O.; KOSTYUMOV, I.I.

Regional perfusion in treating vascular occlusions of the extremities. Ortop. travm. i protez. 26 no.6:19-22 Je '65. (MIRA 18:8)

1. Iz kafedry fakul'tetskoy khirurgii (zav.- zasluzhennyy deyatel' nauki prof. V.I. Kolesov) I Leningradskogo meditsinskogo instituta imeni akademika Pavlova.

KOLESOV, V.I., prof.; DEMIN, V.N., prof.; LEVIN, A.G.; SHAL'NEVA, T.S.; BOMASH, N.Yu., VINOGRADOV, A.G.; LEOCKO, V.A.; SIDORENKO, L.N.; YARITSYN, S.S.

Regional perfusion of chemotherapeutic substances in malignant tumors of the extremities. Vest.khir. 93 no.8:58-64 Ag '64. (MIRA 18:7)

1. Iz fakul'tetskoy khirurgicheskoy kliniki (zav. - prof. V.I. Kolesov) 1-go Leningradskogo meditsinskogo instituta imeni Pavlova.

D'YACHENKO, I.I.; LEVIN, A.O.

State of the blood circulation system in regional perfusion of the extremities. Vest. khir. 93 no.9:71-76 S '64. (MIRA 18:4)

1. Iz fakul'tetskoy khirurgicheskoy kliniki (zav. - prof. V.I.Kolesov) 1-go Leningradskogo meditsinskogo instituta imeni Pavlova.

KOLESOV, V.I., (Leningrad, ul. Kuybysheva, d.3, kv.5); LEVIN, A.O.; VINOGRADOV, A.G.; DANILOVA, L.D.; LEOSKO, V.A.

Changes in the morphological and functional properties of the blood and hemodynamics during work with artificial circulation apparatus of the systems of the Scientific Research Institute of Experimental Surgical Apparatus and Instruments (AIK-59) and Baliuzek (ISL-2). Grud. khir. 5. no.6:34-40 N-D'63 (MIRA 17:2)

1. Iz kliniki fakul'tetskoy khirurgii (zav. - prof. V.I. Kolesov) I Leningradskogo meditsinskogo instituta imeni I.P.Pavlova.

LEVIN, A.O., kand.med.nauk.

Homoplasty of the esophageal defect after excision of a fibroma. Khirurgiia no.3:120-122 '63. (MIRA 16:5)

1. Iz kafedry fakul'tetskoy khirurgii (zav.-prof.V.I.Kolesov) Pervogo Leningradskogo meditsinskogo instituta imeni akad. I.P.Pavlova.

(ESOPHAGUS—SURGERY)

LEVIN, A. O.:

LEVIN, A. O.: "Gas metabolism in stomach cancer." Min Health RSFSR. First Leningrad Medical Inst imeni Academician I. P. Pavlov. Leningrad, 1956. (Dissertation for the Degree of Candidate in Medical Sciences)

So: Knizhnaya letopis' No. 36, 1956 Moscow

LEVIN, A.O.

Maksimilian Kazimirovich Kitaevskii. Khirurgiia no.12:127-128 '61. (MIRA 15:11)

(KITAEVSKII, MAKSIMILIAN KAZIMIROVICH, 1850-)

LEVIN, A. S.

42689. LEVIN, A. S. Vozrastnyye Osobennosti Dykhaniya U Detey Pri Zabolevanii Tuberkuleznym Meningitom Izvestiya Akad. Naur BSSR, No 4, 1948, s. 119-24

SO: Letopis' Zhurnal'nykh Statey, Vol. 7, 1949

LEVIN, A. S.

24435 LEVIN, A. S. Zlokachestvennyye novoobrazovaniya yaichka. Trudy Glav. voyen. Gospitalya Vooruzh. Sil. SSSR. im. Akad. Burdenko. VIP. 6, M., 1946, S. 186-94. - Bibliogr: 35 nazv.

SO: Letopis, No. 32, 1949.

LEVIN, A. S.
1374

Respiration of children of different ages with tb meningitis Pediatriya 1950, 4 (33-34)
The periodic interruption of respiration after expiration was registered, pneumographically in 70 patients aged 5 months to 14 years. In young children the expiratory apnoea begins in the 2nd week of the illness, in older children in the 3rd week. The breathing becomes rhythmic again 1 to 2 days before death. The expiratory apnoea disappears 1 or 2 days after the beginning of effective streptomycin treatment. Pneumographic recording gives information on the duration and severity of the meningitis and the reaction of the organism to streptomycin.

Salamun - Koper (XX, 7, 8, 15)

So: Excerpta Medica, Section VIII, Vol. 5, No. 4, April 1952

Name: LEVIN, Aron Samuilovich

Dissertation: Pneumo-graphic and electrocardiographic study during tubercular meningitis and pneumonia of children

Degree: Doc Med Sci

Affiliation: Belorussian State Inst for Advanced Training of Physicians

Defense Date, Place: 10 Nov 55, Council of Minsk State Med Inst

Certification Date: 10 Nov 57

Source: BMVO 24/57

LEVIN, A.S., dots.

Study of arterial blood pressure in children with pneumonia [with summary in English]. Pediatriia 36 no.9:15-17 D'58 (MIRA 11:11)

1. Iz kafedry pediatrii Belorusskogo instituta usovershenstvovaniya vrachey (dir. - prof. M.N. Zhurkova).
(PNEUMONIA, in inf. & child.
blood pressure changes (Rus))
(BLOOD PRESSURE, in various dis.
pneumonia in child (Rus))

LEVIN, A.S., doktor med.nauk

Abdominal syndrome in children. Vestsi AN BSSR. Ser.biial.nav. no.2:111-116 '60. (MIRA 13:7)
(CHILDREN--DISEASES) (COLIC)

LEVIN, A.S., doktor meditsinskikh nauk

Diagnosis and treatment of pneumonia in young children. Zdrav. Belor. 6 no. 5:55-57 My '60. (MIRA 13:10)

1. Zaveduyushchiy kafedroy pediatrii Belorusskogo instituta usovershenstvovaniya vrachey.
(PNEUMONIA)

LEVIN, A.S., zasluzhennyy vrach RSFSR; KHROMECHEK, B.I.

Goiter of the radix linguae. Vest.otorin. 22 no.5:69-70 S-O '60. (MIRA 13:11)

1. Iz Moskovskogo nauchnogo otorinolaringologicheskogo otdeleniya i detskogo lechebno-profilakticheskogo ob"yedineniya, Krasnoyarsk.
(GOITER) (TONGUE—DISEASES)

LEVIN, Aron Samuylovich, prof.; LEONOV, V.A., akademik, red.; ZAYTSEVA, T., red. izd-va; VOLOKHANOVICH, I., tekhn. red.

[Essays on pediatrics] Ocherki po pediatrii. Minsk, Izd-vo Akad. nauk BSSR, 1961. 182 p. (MIRA 15:1)

1. Akademiya nauk BSSR (for Leonov)
(CHILDREN—DISEASES)

BERNSHTEYN, M.Kh.; YABKO, Ya.M.; LEVIN, A.S.; ZAYONCHKOVSKIY, A.D.; ZHURKO, V.A.

Artificial leather in rolls with a nonwoven base for the shoe uppers of summer footwear. Kozh.-obuv. prom. 6 no.7:20-23 Jl '64. (MIRA 17:8)

5(2)

AUTHORS: Mazurin, O.V., Levin, A.S.

SOV/153-58-2-23/30

TITLE: On the Problem of Selecting a Rational Measuring Method of the Electric Conductivity of Glasses (K voprosu o vybore ratsional'noy metodiki izmereniya elektroprovodnosti stekol)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 2, pp 142 - 146 (USSR)

ABSTRACT: The method by Shchukarev and Myuller (Ref 1) for the measuring of the electric conductivity of glasses may be regarded as the most rigid method. The authors had to find out whether the measuring results in using graphite or silver electrodes agree with those where amalgam electrodes were used. The solution of this problem would determine the quality of this or that method, moreover, it would make possible the evaluation of the experimental data from publications. At present the following measuring method is used in the institute mentioned in the Association: the samples have the shape of disks with plane parallel surfaces to which round graphite electrodes are fitted. The measuring cell consists of 2 main parts: a furnace and a lid. Their construction is described in detail. As compared to earlier constructions (Refs 2,3) it shows several advantages. The measurements of resistance (below 10^6 ohm)

are carried out by means of alternating current (frequency: 50 cycles) by a bridge for the measuring of capacitances and resistances. In the case of higher resistances direct current and a megohmmeter LM-2 are used. Both devices are bridge connections. In both cases 6E5 lamps serve as equilibrium indicators. In the investigation of the electric conductivity the method mentioned in reference 1 was considerably simplified. Figure 2 shows the construction of the amalgam electrode. A stabilized constant voltage was applied to the sample. The resistance of the sample was measured by recording the passing voltage by means of a micro-ammeter. It can be seen from table 1 that in the case of a prolonged passing of the voltage the resistance of the sample decreases to a certain extent even if the temperature of the hot junction of the thermocouple remains constant on the surface of the sample. The authors assumed that the resistance decreased due to the heating of the sample by the passing voltage. Therefore the authors interrupted the voltage for 20 minutes and then measured again the resistance. Table 1 reveals that after the interruption the resistance had increased again to the original value. A control computation has demonstrated that the above assumption made by the authors is very likely. Therefore

it can be concluded that the values of the resistance at the first moment after the switching on of the voltage can be regarded as the real resistances. Figure 3 shows measuring results of the resistance at various temperatures at the first moment after the switching on of the voltage. The dependence of the resistance on temperature proved to be linear as expected. Resistances measured with direct and alternating current proved to be the same. Figure 3 shows also measuring results when graphite electrodes were used. In contrast to the existing opinion silver electrodes cannot be regarded in any case as reversible (Fig 2). The authors arrived at the conclusion that graphite electrodes show the same results as amalgam electrodes. Since the first considerably simplify the method it is not expedient to use amalgam electrodes for the mentioned purposes. There are 3 figures, 2 tables, and 4 references, 3 of which are Soviet.

ASSOCIATION: Leningradskiy tekhnologicheskiy institut imeni Lensoveta (Leningrad Technological Institute imeni Lensovet)
Kafedra stekla (Chair of Glass)

ACC NR: AP6017982 (N) SOURCE CODE: UR/0413/66/000/010/0085/0085

INVENTOR: Kalinin, A. V.; Kalinin, V. V.; Levin, A. S.

ORG: None

TITLE: A seismoacoustic unit. Class 42, No. 181829 [announced by Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 10, 1966, 85

TOPIC TAGS: seismologic station, acoustic detector, hydrologic instrument

ABSTRACT: This Author's Certificate introduces: 1. A seismoacoustic unit for exploration of shallow waters on seas, lakes and rivers. The installation contains an excitation unit, oscillation detectors, units for amplification and filtering, a cathode ray registration device and power supply. Depth of penetration is increased by series connection of an energy converter and storage unit, electric power commutator and electric-spark unit for transmitting elastic oscillations in the excitation unit. 2. A modification of this device designed for effective suppression of the secondary shock generated by electric discharge in a liquid. The discharge electrodes are located in perforated hemispheres of various diameters which are simultaneously used as the second electrode. These hemispheres are mounted on an insulating plate fastened to the lower section of the housing for the oscillation

Card 1/2

UDC: 550.340.19

ACC NR: AP6017982

transmitter. 3. A modification of this device designed for high rates of scanning. Runners are used for mounting the cathode ray tube which records the oscillations on a circular platform. This platform is uniformly rotated by the speed reducer of a DC electric motor. Photographic paper for reproduction of the recording is located in a special channel which has the shape of a cylindrical segment concentric with the platform. 4. A modification of this device in which the quality of the recording is improved by connecting delay cells between the piezoelectric pickups.

SUB CODE: 09, 08/ SUBM DATE: 01Feb65

Card 2/2

LEVIN, A. V.

USSR/Medicine - Dystrophy
Proteins

Mar/Apr 49

"The Use of Products of the Oxygen Hydrolysis of Protein in the Treatment of Dystrophic Conditions," Prof M. M. Gubergrits, Head of Preliminary Therapeutic Clinic, Head of Clinical Experimental Dept, Active Mem, Acad Sci Ukrainian SSR, A. V. Lovin, Sh. E. Kamenetskiy, Preliminary Therapeutic Clinic, Kiev Ord of Red Banner of Labor Med Inst imeni Acad A. A. Bogomolets, Clinical Experimental Dept, Ukrainian Nutrition Inst, 5 pp

"Klin Med" Vol XXVII, No 4

Injected a solution of amino acids and polypeptides, evolved by A. V. Levin from the dissociation of casein, into five dogs with dystrophia. On obtaining positive results with no complications, administered the solution to human patients. Of 46 adult patients treated for alimentary toxic dystrophy, 36 showed positive results and eight, no improvement. Tabulated results obtained from two of the experimental dogs, and analyzes the change in protein content of the blood in two patients, discussing their case histories in detail. Tabulates data on two control cases. Results of the treatment appear quite favorable.

PA 66/49T83

LEVIN, A.V.

"Economics and organization of chemical industries" by S.Z.Pogostin. Reviewed by A.V.Levin. Khim.prom. no.4:295-296 Ap '61. (MIRA 14:4)

(Chemical industry)
(Pogostin, S.Z.)

LEVIN, A.V.

Change-over to the 7-hour workday and a new system of wages at the enterprises of the chemical industry of the Moscow Province Economic Council. Khim.prom. 2:157-161 My '60. (MIRA 13:7)

1. Upravleniye khimicheskoy promyshlennosti Mosoblsovnarkhoza.

(Moscow Province--Chemical industries)
(Hours of labor)

LEVIN A V

PHASE I Treasure Island Bibliographic Report

BOOK

C00000044

Author: LEVIN, A.V. Call No.: TJ 737.L48

Full Title: WORKING BLADES AND DISCS OF STEAM TURBINES

Transliterated Title: Rabochie lopatki i diski parovykh turbin

Publishing Data

Originating Agency: None.

Publishing House: State Power Engineering Publishing House (GEI)

Date: 1953 No. pp.: 624 No. copies: 4,000

Editorial Staff

Editor: None.

Editor-in-Chief: None. Technical Editor: None.

Text Data Appraiser: None.

Coverage: This text explains the theory of the operating conditions of blades and discs in steam turbines; gives methods of calculating their vibration and stability; and considers their vibration on an immobile and a revolving rotor. The forces acting on discs and blades during the functioning of the turbine are examined, and the measures necessary to ensure the kind of desired performance are indicated. While the tangential vibration of the set of blades and the axial vibration of the discs is extensively studied, little attention is given to other forms of vibration. Numerous mathematical expressions appear in the charts and diagrams.

1/2

Card 2/2

Full Title: WORKING BLADES AND DISCS OF STEAM TURBINES. Call No.: TJ 737.L48 00000044

Purpose: For designers and scientists, for engineers concerned with the operation and investigation of steam turbines in electric power installations. Can also be used as a text for students specializing in steam turbines in energetics and machine-building courses of study.

Facilities: Dr. of Technical Sciences Prof. M.I. Grinberg, Candidate in Mathematical Physics A.M. Katz, and Candidate in Technical Science M.E. Deich are thanked for important comments on the manuscript.

No. Russian and Slavic References: Total 78, Russian 62.

Available: Library of Congress.

LEVIN, A. V., LOMAKIN, A. A., FRENKEL, L. D., CHERNIN, M. N., KHEIFETS, M. Z., GRINBERG, M. I.; Gas-Turbine Installation GT-12-3 of the Leningrad Metal Works, ENERGOMASHINOSTROENIE (Power Machinery Construction), No. 6, June 1956.

The article describes the arrangement and characteristic of a gas turbine installation designed and manufactured in the Leningrad Metal Works and intended to work on gas produced from coal by underground gasification. the power is 12,000 kw. $\eta \approx 27\%$

LEVIN, A.V

pr

PHASE I BOOK EXPLOITATION 1144

Leningradskiy metallicheskiy zavod imeni Stalina, Leningrad

Razvitiye tekhniki na Leningradskom Metallicheskom zavode imeni Stalina (Technological Developments at the Leningrad Metal Works imeni Stalin) Moscow, Mashgiz, 1957. 313 p. 6,000 copies printed.

Ed.: Bushuyev, M.N., Engineer; Editorial Board: Berezin, B.A., Engineer; Mernik, M.Kh.; Sutokskiy, N.V., Engineer; Edel', Yu.U., Candidate of Technical Sciences; Ed. of Publishing House: Gofman, Ye.K.; Tech. Ed.: Pol'skaya, R.G.; Chief Ed. (Leningrad Division, Mashgiz): Bol'shakov, S.A., Engineer.

PURPOSE: This book is intended for personnel of the LMZ (Leningrad Metal Works) and also for other plants and institutes.

COVERAGE: The book was published in connection with the 100th anniversary of the Leningrad Metal Works and contains articles

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dealing with the technological progress of the plant in developing powerful steam, gas, and hydraulic turbines.

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Technological Developments (Cont.) 1144

AVAILABLE: Library of Congress (TJ267.L4)

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GO/mfd
2-11-59

LEVIN, A. V.

Levin, A. V., Candidate of Technical Sciences, and Shur, S. S., Engineer.
Blade-root Torsional Vibration in Steam Turbines page 213

The article presents a theoretical investigation of Turbine blade vibrations. The authors derive equations for determining the mode of vibration and also give curves showing the stresses developed in Turbine blades.

Steam and Gas Turbine Construction, Moscow Mashgiz, 1957, 351 pp.

SOV/124-58-11-13460

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 11, p 214 (USSR)

AUTHORS: Levin, A. V., Shur, S. S.

TITLE: Torsional Vibrations Arising Within Groups of Steam-turbine Rotor Blades (Vnutripaketnyye krutil'nyye kolebaniya rabochikh lopatok parovykh turbin)

PERIODICAL: [Tr.] Leningr. metallich. z-da, 1957, Nr 5, pp 213-230

ABSTRACT: An investigation of the vibrations of the blades of large turbines which lead to the rupture of the blades and the tearing of the banding. Solutions are adduced for the differential equations of the torsional vibrations for groups with a finite and an infinite number of blades of constant section. The great amount of scatter in the vibrational frequencies in various shapes of a single mode is noted; this scatter is confirmed by experimental data. Differential equations are adduced for the torsional vibrations of blades having a variable section; these are solved by the method of successive approximations. A method is provided for the determination of the relative stresses arising during torsional vibrations in a blade and in the banding.

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K. S. Pul'kis

LEVIN, A.V.
p. 2

SOV/96-58-9-20/21

AUTHOR: Belinskiy, S.Ya. (Candidate of Technical Science)

TITLE: A Conference on New Types of Equipment for Unit-type Power Stations employing Super-critical Steam Conditions (Soveshchaniye po voprosam novykh tipov oborudovaniya dlya blochnykh elektrostantsiy na sverkhkriticheskiye parametry para)

PERIODICAL: Teploenergetika, 1958, Nr 9, pp 92 - 95 (USSR)

ABSTRACT: A Conference on new types of equipment for unit-type power stations operating on super-critical steam conditions was called by the High Temperature Steam Commission of the Power Institute of the Academy of Science of the USSR on 14th-16th May, 1958. It was attended by more than 150 representatives of power equipment manufacturers, design organisation research institutes and of GOSPLAN USSR and RSFSR, the Ministry of Power Stations and the Scientific-Technical Committee of the USSR. Engineer S.I. Molokanov read a report on 'The prospective application of large unit sets with super-critical steam conditions'. An article of similar content by this author is published in this issue of this journal. Candidate of Technical Science

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A Conference on New Types of Equipment for Unit-type Power Stations Employing Super-critical Steam Conditions

N.L. Oyvin, of Teploelektroproyekt, gave a report entitled 'Technical tasks in designing the main equipment for initial steam conditions of 240 at and 580°C'. Candidate of Technical Science V.P. Studenskiy, also of Teploelektroproyekt, dealt with 'The design of the thermal part of a 2400-MW regional power station'. Engineer V.A. Zvyagintsev, of Teploelektroproyekt, gave important information about the design of superposed equipment and 300-MW unit-type sets for steam conditions of 300 at. and 620°C. Doctor of Technical Science V.P. Romadin reported upon 'Investigations of the All-Union Thermo-Technical Institute into super-critical steam conditions and associated problems'. Candidate of Technical Science A.V. Levin gave information about turbines of 300 - 400 MW for steam conditions of 240 at., 580°C and 300 at., 650°C, developed by the Leningrad Metal Works. Candidate of Technical Science M.A. Ploskovitov, of the Central Boiler Turbine Institute, described 'A design for a direct-flow boiler of 710 tons per hour at 315 at. and 655°C'. Candidate of

A Conference on New Types of Equipment for Unit-type Power Stations Employing Super-critical Steam Conditions

Technical Science K.A. Rakov, of the All-Union Thermo-Technical Institute, spoke on 'Development of the thermo-technical bases of super-high-output boiler sets for super-critical pressure' and Engineer V.M. Biman, of ORGENERGOSTROY, gave a report entitled 'Development of the design of a boiler set for 300 at., 650°C, for a 300-MW unit'. A report by Doctor of Technical Science Ya.M. Rubinshteyn, of the All-Union Thermo-Technical Institute, was entitled 'The selection of method of drive for feed pumps for a power station with an initial pressure of 300 at.'. Doctor of Technical Science A.A. Lomakin, of the Leningrad Metal Works, recounted the design of feed pumps for very large unit sets running at super-critical steam conditions. Doctor of Technical Science L.D.Berman, of the All-Union Thermo-Technical Institute, discussed 'The provision of high-density condensers for steam turbines in unit-type power stations with super-critical conditions'. Candidate of Technical Science A.E. Gel'tman, of the Central Boiler Turbine Institute, reported on 'The

A Conference on New Types of Equipment for Unit-type Power Stations Employing Super-critical Steam Conditions

selection of parameters and characteristics for power equipment in regional condensing power stations'. The article contains a brief account of each of the above reports. The resolutions of the meeting noted that, despite considerable improvements in recent years, the efficiency of power equipment, particularly auxiliaries, should still be improved. The main lines that should be followed in designing power stations for unit sets of 300 and 600 MW are stated; this comprises a list of some 15 items raging from methods of fuel drying to the use of welded rotors and cylinders. It was noted that feed pumps take too long to manufacture. Research on metals and the development of equipment for very high steam conditions should be expedited.

1. Steam power plants--USSR

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87961
S/114/60/000/007/001/009
E194/E455

26.2122

AUTHOR: Levin, A.V., Candidate of Technical Sciences

TITLE: Calculation of the Natural Frequency of Bladed Discs With Naturally Twisted Blades

PERIODICAL: Energomashinostroyeniye, 1960, No.7, pp.1-5

TEXT: Experimentally-determined values of the natural frequencies of bladed rotor discs are always lower than the calculated values. The difference is attributed to the circumstance that the theoretical calculations made no allowance for the reduction in axial frequency due to natural twisting of the blades. If, on the other hand, allowance is made, then the calculated blade frequency values fall into good agreement with experimental values. In making these calculations of the natural frequency of bladed discs, it is necessary to know the curve through which they bend during oscillation. A blade with natural twisting and in the unstrained state is then considered theoretically in a system of coordinates that passes through the centre of gravity of the root section. One axis is made parallel to the axis of rotation of the rotor, the second is perpendicular to it and the

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Calculation of the Natural Frequency of Bladed Discs With Naturally Twisted Blades

third is in the plane of the blade. The differential equations of blade bending allowing for natural twisting are of the form of Eq.(2). When this is substituted into the expression for the moments acting in the blade section relative to the main axes of inertia, Eq.(3) is obtained. This expression is the differential equation of oscillation (static bending) of a natural twisted blade. When a bundle of blades interconnected by three lacing wires is then considered, Eq.(3) assumes the form of Eq.(7), which is integrated with appropriate boundary conditions to obtain Eq.(10). In this way, the first approximation to a solution of Eq.(7) is obtained and is shown to be of satisfactory accuracy. The method of calculating the shape of the oscillation at the second (axial) frequency is then explained briefly and is very similar. In this case, it is necessary to use the second approximation to the solution. A calculation is then made of the resonant frequency of a bladed disc with twisted blades. The method of calculation is one developed by the author for rotors

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E194/E455

Calculation of the Natural Frequency of Bladed Discs With Naturally Twisted Blades

with long blades, and published in his book. After various preliminary formulae have been derived, an expression for the frequency is quoted from the book and a solution obtained. There are 3 figures and 2 Soviet references.

Card 3/3

LEVIN, A.V., kand.tekhn.nauk

Selecting the optimum unit power for single-shaft steam turbines. Teploenergetika 7 no.2:12-17 F '60.
(MIRA 13:5)

1. Leningradskiy metallicheskiy zavod.
(Steam turbines)

LEVIN, A. V.

DocdTech Sci - (diss) "Vibration of disks of steam turbines." Moscow, 1961. 22 pp; (Ministry of Higher and Secondary Specialist Education RSFSR, Moscow Order of Lenin Power Inst); 150 copies; free; (KL, 7-61 sup, 230)

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24.4200

S/114/61/000/008/001/005
E194/E155

AUTHORS: Levin, A.V., Candidate of Technical Sciences, and Shur, S.S., Engineer

TITLE: Torsional oscillations of runner blades bound into a bundle

PERIODICAL: Energomashinostroyeniye, 1961, No.8, pp. 1-4

TEXT: The theoretical investigations of this article show that whereas an individual blade has a single mode of oscillation for each frequency of torsional oscillation, n blades laced as a group have n modes of oscillation. Blades in the group may oscillate at different amplitudes depending on the mode of oscillation; oscillations of this type are termed "inter-bundle torsional oscillations". For each harmonic the frequencies of the different modes of oscillation are very different from one another. In this respect, torsional oscillations differ from bending oscillations of bundles. The wide frequency range of inter-bundle torsional oscillations of various modes of a given harmonic, which is confirmed experimentally, makes it difficult to detune to prevent resonance, particularly as the lacing wire, though it may

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modify certain frequencies, does not render them impossible, as in bending oscillations. Fig.1 shows the modes of torsional oscillation (angles of twist) of the third harmonic of a group of seven blades of constant section laced by two wires, and Table 1 gives the frequencies of the fundamental frequency, the second and third harmonics of this group. At the maximum frequency for each harmonic all the blades twist in the same direction and differ from one another only in amplitude. At this frequency the mode of oscillation approximates to the mode of torsional oscillations of an individual blade, or to that of a group with an infinite number of blades in which all the blades oscillate under identical conditions. Accordingly, the upper limiting frequency for each harmonic may be determined by considering a group with an infinite number of blades. Thus, for the group which is the subject of Table 1 the frequency determined on the assumption of an infinite number of blades is as follows:

Harmonic	Frequency c/s
1	f_1 = 1024
2	f_2 = 1371
3	f_3 = 2180

Torsional oscillations of runner ....

Fig.2 gives curves of the relative stresses in the third harmonic of torsional oscillation in blades of a group laced by two wires, and Table 2 gives the ratio of the stress in the upper wire to the stress in the lower one. It will be seen from this table that for the fundamental and third harmonics these ratios do not alter much for different modes of oscillation, whereas for the second harmonic the ratio varies from 1.3 to 3.27. During torsional oscillations of groups of blades the bending stresses in the lacing wires are much greater than the blade stresses; this is undoubtedly a cause of wire breakage in practice. The differential equation of torsional oscillation in the closed form can only be solved for blades of constant section, for which the equation is of the form

$$\frac{d^2S}{dx^2} + \rho^2 S = 0 \qquad (1)$$

where S is a function that determines the mode of torsional oscillation; x is the relative coordinate;

$$\rho^2 = \frac{p^2 \gamma J_c \ell^2}{gGJ_p} \qquad (2)$$

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Torsional oscillations of runner ....

where: p is the angular frequency of torsional oscillation; γ is the specific weight kg/cm^2; J_c is the polar moment of inertia of the section relative to the centre of bending, cm^4; l is the working length of the blade, cm; g is the acceleration of gravity, cm/sec^2; GJ_p is the torsional rigidity kg/cm^2. The mass of the wire is assumed concentrated at the centre of bending. Boundary conditions are defined and a solution is presented as follows:

$$
\begin{aligned}
&0 \leq x \leq x_1;\\
&S_m = -\frac{l}{GJ_{pQ}\cos Q}\,[M_m \cos Q(1-x_1) + \\
&\quad + N_m \cos Q(1-x_2)]\sin Qx;\\
&x_1 \leq x \leq x_2;\\
&S_m = -\frac{l}{GJ_{pQ}\cos Q}\,[M_m \cos Q(1-x)\sin Qx_1 + \\
&\quad + N_m \cos Q(1-x_2)\sin Qx];\\
&x_2 \leq x \leq 1;\\
&S_m = -\frac{l}{GJ_{pQ}\cos Q}\,[M_m \sin Qx_1 + N_m \sin Qx_2] \times \\
&\quad \times \cos Q(1-x).
\end{aligned}
\qquad (6)
$$

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Torsional oscillations of runner ...

In these equations M_m and N_m are respectively the torques acting on the m^{th} blade from the lower and upper wires. The method of determining these torques is then explained. The following formula is then derived for a group of an infinite number of blades bound by two wires:

$$\frac{k_1 k_2}{\rho} \sin \rho x_1 \sin \rho(x_2 - x_1) \cos \rho(1 - x_2) + \\ + k_1 \sin \rho x_1 \cos \rho(1 - x_1) + \\ + k_2 \sin \rho x_2 \cos \rho(1 - x_2) + \rho \cos \rho = 0 \qquad (20)$$

As mentioned above, solution of this equation gives the maximum frequency of inter-group torsional oscillation. The method of determining the other frequencies of torsional oscillation is also explained.
There are 5 figures, 4 tables and 4 Soviet references.

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LEVIN, A.V., doktor tekhn.nauk; SPIRIDONOV, K.A., inzh.

Overloading of steam turbines. Elek. sta. 33 no.10:26-28 O '62. (MIRA 16:1)

(Steam turbines) (Electric power plants)

LEVIN, A.V., doktor tekhn. nauk; LISNYANSKIY, F.A., inzh.; SOROKIN, N.A., inzh.

The VK-100-6 turbine manufactured by the Leningrad Metal-working Plant (22d Congress of the CPSU). Elek. sta. 35 no.2:15-20 F '64. (MIRA 17:6)

ZIL'BERMAN, A.S., kand. tekhn. nauk; LEVIN, A.V., doktor tekhn. nauk

Efficiency of high-pressure turbines manufactured by the Leningrad Metalworking Plant (22d Congress of the CPSU). Teploenergetika 10 no.10:2-10 O'63 (MIRA 17:7)

1. Leningradskiy metallicheskiy zavod.

ACC NR: AP6018852 SOURCE CODE: UR/0367/65/002/006/1049/1053

AUTHOR: Azimov, S. A.; Botor, Ye. V.; Gulyamov, U. G.; Yeroshkina, N. B.; Lovin, A. Ya.

ORG: Institute of Nuclear Physics, AN UzSSR (Institut yadernoy fiziki AN UzSSR)

TITLE: Coherent inelastic interactions between high-energy pi sup minus mesons and heavy nuclei in photoemulsions [This paper was given at the 14th Annual Conference on Nuclear Spectroscopy, Tbilisi, February 1964]

SOURCE: Yadernaya fizika, v. 2, no. 6, 1965, 1049-1053

TOPIC TAGS: pi meson, heavy nucleus, inelastic interaction, pion, nuclear emulsion

ABSTRACT: The characteristics of interactions assumed to be the coherent inelastic reactions $\pi^- + A \rightarrow \pi^+ + \pi^- + \pi^- + A'$ on heavy nuclei in a photoemulsion are investigated for 17.2 Gev/c primary pion momenta. The cross-section of this process is found to be 5.4 ± 1.4 mbn. Compared with the corresponding value for carbon, this indicates a dependence of the cross-section on the atomic number of the type $A^{2/3}$ or $A^{1/3}$. Orig. art. has: 5 figures and 8 formulas. [Based on authors' Eng. abst.] [JPRS]

SUB CODE: 20 / SUBM DATE: 17Apr65 / ORIG REF: 003 / OTH REF: 012

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ACC NR: AP6025669 SOURCE CODE: UR/0413/66/000/013/0143/0143

INVENTOR: Levin, A. Ya.; Orlov, V. A.

ORG: none

TITLE: Thermal- and acoustic-insulation covering for aircraft cabins and compartments. Class 62, No. 183593

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 13, 1966, 143

TOPIC TAGS: acoustic insulation, heat insulation, aircraft cabin environment

ABSTRACT: An Author Certificate has been issued for a thermal- and acoustic-insulating covering for cabins and compartments in transport aircraft, the skins of which are made up of sections of longitudinal and transverse load-bearing units using porous material laid onto the skin in one or several layers. To better utilize the thermal- and acoustic-insulation properties of the materials (e. g., of ultra thin glass wool), to facilitate installation and removal, and to protect cooled surfaces from water condensation, the covering is made in the form of separate blocks coated with a waterproof film. These blocks are then placed in the section frames of the skin and secured to the latter around the edges by a plastic strip having an adhesive layer which provides hermetic sealing and ease of removal. Polyisobutylene or some other nonsetting adhesive is used to bond the blocks to the skin. [WH]

SUB CODE: 11/ 01/ SUBM DATE: 20Jul64/ ATD PRESS: 5047
UDC: 629.135/138

Card 1/1

LEVIN, A. Ye. Dr. Med. Sci.

Dissertation: "Data on the Clinical Physiology of the Stomach." Second Moscow State Medical Inst. imeni I. V. Stalin. 23 Jun 47.

SO: Vechernyaya Moskva, Jun, 1947 (Project #17836)

LEVIN, A.Ye.; POROYKOVA, O.D.

Treatment of gastric and duodenal ulcer with hyaluronic acid. Sovet. med. 16 no.4:21-22 Apr 1952. (CLML 22:1)

1. Of the Department of the Propedeutics of Internal Diseases (Head — Prof. M. A. Volin), Second Moscow Medical Institute imeni I. V. Stalin, and of Fourth Moscow Municipal Clinical Hospital (Head Physician — P. G. Demidov).

LEVIN, A.Ye.

MD

The relation between cancer of the stomach and achylia gastrica. A. B. Levin. *Sborník Nauch. Trudov Krasnoyarsk. Gosudarst. Med. Inst.* 1953, No. 3, 168–9; *Referat. Zhur., Biol.* 1955, No. 2161.—A study was made of the amt. of trypsin in the duodenal contents of 13 subjects having chronic anacidic gastritis and 8 having cancer of the stomach. In 8 subjects the trypsin varied between 160 and 1250 units, in 6 between 2500 and 5000 units, and in 7 it exceeded 5000 units. Amylase in 16 subjects varied between 320 and 1250 units, in 3 between 2500 and 5000 units, and in 2 it exceeded 5000 units. The normal levels of trypsin and amylase generally vary between 160 and 2500 units. The concn. of trypsin in the stomach was studied in 17 subjects with anacidic gastritis and 5 with cancer of the stomach. No trypsin was found in 5, it varied between 1000 and 2000 units in 10, and in one it reached 4000 units. Amylase was studied in the stomach of 20 patients with anacidic gastritis and in 12 with cancer of the stomach. No amylase was found in 5; it varied between 100 and 500 units in 15, between 800 and 1600 units in 7, and in 5 between 3200 and 6400 units.

B. S. Levine

LEVIN, A. Ye.

USSR/General Problems of Pathology - Tumors. T-5

Abs Jour : Ref Zhur - Biol., No 3, 1958, 12746

Author : Levin, A.Ye., Pshonik, A.T., Kostyuk, F.F.

Inst : Not given.

Title : Plethysmographic Studies of Cancer Patients.

Orig Pub : Sb. nauch. tr. Krasnoyar. med. in-ta, 1955, No 4, 215-216

Abstract : This is a communication on the vascular responses in cancer patients studied by plethysmography. It was determined that vascular unconditioned and orientation responses, as well as responses to verbal signals, were decreased; this indicates a depression of excitatory processes in the cerebral cortex.

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LEVIN, A.Yu.

An algorithm for the minimization of convex functions. Dokl. AN SSSR 160 no.6:1244-1247 F '65. (MIRA 18:2)

1. Voronezhskiy gosudarstvennyy universitet. Submitted November 20, 1964.

ACC NR: AP7002381 SOURCE CODE: UR/0020/66/171/005/1037/1040

AUTHOR: Levin, A. Yu.

ORG: Voronezh State University (Voronezhskiy gosudarstvennyy universitet)

TITLE: The classification of nonoscillating cases for the differential equation $\ddot{x} + p(t)\dot{x} + q(t)x = 0$ when $q(t)$ is of constant sign

SOURCE: AN SSSR. Doklady, v. 171, no. 5, 1966, 1037-1040

TOPIC TAGS: linear differential equation, second order differential equation

ABSTRACT: For the equation $$\ddot{x} + p(t)\dot{x} + q(t)x = 0 \quad (-\infty < a \leqslant t < b \leqslant \infty), \qquad (1)$$ in real functions p and q and when q does not change signs in the interval $[a,b)$ and when the solutions of (1) do not oscillate, a complete classification is offered of the possible types of fundamental systems of solutions of (1) under the following types of behavior of the solutions as $t \to b$: convergence to zero, to a non-zero limit, or to infinity; increasing or decreasing near b (any solution will be monotonic near b in the nonoscillation case). The five cases are presented in tabular form for the six conditions relating to the convergence or nonconvergence properties of integral expressions in p and q and in sign of q. In all, eight distinct cases are found

UDC: 517.94

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ACC NR: AP7002381

to exist. Presented by Academician L. S. Pontryagin on 16 February 1966. Orig. art. has: 12 formulas, 2 tables.

SUB CODE: 12/ SUBM DATE: 10Feb65/ ORIG REF: 004/ OTH REF: 004

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66818
SOV/155-58-5-8/37

16(1) 16.3400

AUTHOR: Levin, A.Yu.

TITLE: On the Multipoint Boundary Value Problem

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 5, pp 34-37 (USSR)

ABSTRACT: The author considers the boundary value problem

(1) $L[y] \equiv y^{(n)} + p_1(t)y^{(n-1)} + \ldots + p_n(t)y = f(t)$

(2) $y(a_i) = A_i \qquad (i = 1,2, \ldots,n)$

where $p_i(t)$ and $f(t)$ are continuous on $[a,b]$ and $a_1 < a_2 < \ldots < a_n$ are points of $[a,b]$.

Theorem: In order that (1) - (2) possesses a solution for arbitrary $f(t)$, $A_1,\ldots,A_n$, it is sufficient that $h < h_1$, where $h = a_n - a_1$ and h_1 is the only positive zero of

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On the Multipoint Boundary Value Problem

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$$P_1(z) = \frac{(n-1)^{n-1}}{n^n n!} p_n^* z^n + \sum_{k=1}^{n-1} \frac{1}{k!} p_k^* z^k - 1$$

where $p_i^* = \max_{a_1 \leq t \leq a_n} |p_i(t)|$.

Further three theorems contain similar other sufficient conditions of the type $h < h_i$, where h_i is the zero of a certain polynomial.

Theorem : Let the zero be no eigen value of $L[y]$ for boundary conditions

(3) $\alpha_i^{(0)} y(a_i) + \alpha_i^{(1)} y'(a_i) + \ldots + \alpha_i^{n-1} y^{(n-1)}(a_i) = 0$ $(i=1,2,..,n)$

The function f continuous in all variables $(a \leq t \leq b, -\infty < v_i < +\infty)$ is assumed to satisfy the condition

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On the Multipoint Boundary Value Problem

$$f(t,v_1,v_2,\ldots,v_n) = o\left(\sum_{i=1}^{n} |v_i|\right) \quad \text{for} \quad \sum_{i=1}^{n} |v_i| \to \infty \ .$$

Then (1) possesses at least one solution satisfying (3). In further theorems the author estimates the radius of the circle in which the spectrum of L^{-1} lies. Altogether he gives 8 theorems. The author thanks M.A. Krasnosel'skiy for guidance.

There are 7 references, 1 of which is Soviet, 1 French, 1 Italian, 2 American, and 2 German.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: July 16, 1958

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S/020/60/135/004/005/037
C111/C222

16.3500

AUTHOR: Levin, A.Yu.

TITLE: A Comparison Principle for Second Order Differential Equations

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol.135, No.4, pp.783-786

TEXT: Given the equations

(1) $x_1'' + \varphi_1(t)x_1 = 0$

(2) $x_2'' + \varphi_2(t)x_2 = 0,$

where $\varphi_1(t)$ are summable on [a,b]. Let all appearing equations, especially (1), (2), be almost everywhere satisfied on [a,b]; the solutions always

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A Comparison Principle for Second Order Differential Equations

Then on $[a,b]$ it is $x_2(t) \neq 0$ and it holds

$$(4) \qquad -\frac{x_1'(t)}{x_1(t)} > \left|\frac{x_2'(t)}{x_2(t)}\right|, \quad a \leq t \leq b;$$

2) If on $[a,b]$ it is

$$(5) \qquad \frac{x_1'(b)}{x_1(b)} + \int_t^b \varphi_1(\tau)\,d\tau > \left|\frac{x_2'(b)}{x_2(b)} + \int_t^b \varphi_2(\tau)\,d\tau\right|, \quad a \leq t \leq b,$$

then on $[a,b]$ it is $x_2(t) \neq 0$ and it holds

$$(6) \qquad \frac{x_1'(t)}{x_1(t)} > \left|\frac{x_2'(t)}{x_2(t)}\right|, \quad a \leq t \leq b.$$

If (3) (resp.(5)) is a strong inequation then (4) (resp.(6)) is a strong inequation too.

Let

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A Comparison Principle for Second Order Differential Equations

$$\int_{(\alpha,\beta)} f(\tau)d\tau = \int_{\min\{\alpha,\beta\}}^{\max\{\alpha,\beta\}} f(\tau)d\tau .$$

From theorem 1 it follows:
Theorem 2: Let the solution $x_2(t)$ of (2) satisfy the conditions

(22) $$x_2(a) = x_2(b) = x_2'(c) = 0, \quad a<c<b.$$

Furthermore, for the coefficients of (1), (2) on $[a,b]$ let the inequation

(23) $$\int_{(c,t)} \varphi_1(\tau)d\tau \geq \left| \int_{(c,t)} \varphi_2(\tau)d\tau \right|, \quad a \leq t \leq b$$

be satisfied. Then every solution of (1) has at least one zero on $[a,b]$.
Given the equations

(24) $$\frac{d}{dt}\left(k_1(t)\frac{dx_1}{dt}\right) + q_1(t)x_1 = 0,$$

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C111/C222

A Comparison Principle for Second Order Differential Equations

(25) $$\frac{d}{dt}\left(k_2(t)\frac{dx_2}{dt}\right)+q_2(t)x_2 = 0 ,$$

where $k_1(t)$, $k_2(t)>0$.

Theorem 3: Let $q_1(t)$, $q_2(t)\geqslant 0$. Let the non-trivial solution $x_2(t)$ of (25) satisfy (22), where a and b are neighboring zeros. In order that each solution of (24) changes to zero on [a,b] it is sufficient that the following conditions are satisfied:

$$\int_a^t \frac{d\tau}{k_1(\tau)} \geqslant \int_a^t \frac{d\tau}{k_2(\tau)}, \quad \int_t^o q_1(\tau)d\tau \geqslant \int_t^o q_2(\tau)d\tau \quad \text{for} \quad a\leqslant t\leqslant o$$

$$\int_t^b \frac{d\tau}{k_1(\tau)} \geqslant \int_t^b \frac{d\tau}{k_2(\tau)}, \quad \int_o^t q_1(\tau)d\tau \geqslant \int_o^t q_2(\tau)d\tau \quad \text{for} \quad o\leqslant t\leqslant b.$$

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A Comparison Principle for Second Order Differential Equations

The author thanks his leader M.A.Krasnosel'skiy.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

PRESENTED: June 22, 1960, by I.G.Petrovskiy, Academician

SUBMITTED: June 18, 1960

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S/020/61/136/005/003/032
C111/C222

16.3410
AUTHOR: Levin, A.Yu.

TITLE: Differential Properties of the Green's Function in a Many-Point Boundary Value Problem

PERIODICAL: Doklady Akademii nauk SSR, 1961, Vol. 136, No. 5, pp. 1022 - 1025

TEXT: The author considers the problem

$$(1)\quad L[x] \equiv x^{(n)} + p_1(t)x^{(n-1)} + \ldots + p_n(t)x = f(t)$$

$$(2)\quad l_i[x] = \sum_{k=0}^{n-1} c_{ik}x^{(k)}(a_i) = A_i\,, \qquad i = 1,2,\ldots, n$$

$$a \leq a_1 \leq a_2 \leq \ldots \leq a_n \leq b$$

(If some a_i are identical then in one point several linearly independent functionals $l_i[x]$ are prescribed). The $p_i(t)$ are continuous in $[a,b]$.

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Differential Properties of the Green's Function in a Many-Point Boundary Value Problem

Let the order of a functional be defined as the order of the highest non-vanishing derivative appearing in it. Let the order of the point a_i be the highest order of the functionals given in a_i. If a_i lies in (a,b) then it is called an inner point. The square $a \leq t$, $s \leq b$ is denoted by K. Let the Green's function G(t,s) of the homogeneous problem

(3) $$L[x] = 0$$

(4) $$l_i[x] = 0, \quad i = 1,2, \ldots, n$$

be defined in K in the usual manner.

Theorem 1 : In order that G(t,s) is continuous in K in all variables it is necessary and sufficient that no point a_i ($i = 1, \ldots, n$) is an inner point of the order n-1 . Then also $G'_t(t,s)$, $G''_{t^2}(t,s)$ ... $G^{(n-2)}_{t^{n-2}}(t,s)$ are continuous in K in all variables.

Theorem 2 : Let $n \geq 3$. In order that G(t,s) and $G'_s(t,s)$ are continuous

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Differential Properties of the Green's Function in a Many-Point Boundary Value Problem

in K in all variables it is necessary and sufficient that among the $a_1, a_2, \ldots, a_n$ there are no inner points of the orders n-1 and n-2 .

Theorem 3 : Let $n \geq 3$; let no points of the orders n-1 and n-2 be in (a_1, a_n). Then for every $\epsilon > 0$ the eigenvalues of the problem

(10) $$L[x] = \lambda x$$

(11) $$l_i[x] = 0 , \quad i = 1,2, \ldots, n$$

satisfy the relation

$$\sum_1^\infty \frac{1}{|\lambda_n|^{2/3+\epsilon}} < \infty .$$

The author mentions A.S. Smogorzhevskiy and A.O. Gel'fond. He thanks

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Differential Properties of the Green's Function in a Many-Point Boundary Value Problem

the leader M.A. Krasnosel'skiy.
There are 8 references : 6 Soviet, 1 French and 1 Italian.

ASSOCIATION: Voronezhskiy gosuderstvennyy universitet
(Voronezh State University)

PRESENTED: October 1, 1960, by G.I. Petrov, Academician
SUBMITTED: September 30, 1960

Card 4/4

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S/020/61/138/001/004/023
C 111/ C 222

AUTHOR: Levin, A. Yu.

TITLE: Some evaluations of a differentiable function

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 1, 1961, 37-38

TEXT: Theorem 1: Let $x(t)$ be n times continuously differentiable on $[a,b]$ and satisfy the conditions

$$x(a_1) = x'(a_2) = \ldots = x^{(n-1)}(a_n) = 0 \qquad (1)$$

where $a_1, a_2, \ldots, a_n$ are certain points of $[a,b]$. Then on $[a,b]$ it holds the estimation

$$|x(t)| \leq C_n (b-a)^n \max_{a \leq t \leq b} |x^{(n)}(t)|, \quad a \leq t \leq b, \qquad (2)$$

where C_1, C_2 are determined by the development

$$\operatorname{tg} t + \sec t = 1 + \sum_{k=1}^{\infty} C_k t^k \qquad (|t| < \frac{\pi}{2}) \; . \qquad (3)$$

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Some evaluations of a. . . .

Theorem 2: Let $x(t)$ satisfy (1), where one of the inequalities

$(a \leq)\ a_2 \leq a_3 \leq \ldots \leq a_n (\leq b)$

$(a \leq)\ a_n \leq a_{n-1} \leq \ldots \leq a_2 (\leq b)$

is satisfied. Then on $[a,b]$ it holds

$$|x(t)| \leq \frac{1}{n\left[\frac{n-1}{2}\right]!\left[\frac{n}{2}\right]!}\,(b-a)^n \max_{a \leq t \leq b} |x^{(n)}(t)|\,,\ a \leq t \leq b\,. \quad (4)$$

The constants in (2) and (4) cannot be improved.

The author considers the boundary value problem:

$$x^{(n)} + p_1(t)\,x^{(n-1)} + \ldots + p_n(t)\,x = f(t) \quad (5)$$

$$x(a_1) = A_1,\ x(a_2) = A_2, \ldots,\ x(a_n) = A_n, \quad (6)$$

$$a \leq a_1 < a_2 < \ldots < a_n \leq b,$$

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Some evaluations of a ...

where $p_1(t), \ldots, p_n(t), f(t)$ are continuous on $[a,b]$. Let $h = a_n - a_1$,

$$\max_{a_1 \leq t \leq a_n} |p_i(t)| = P_i \quad (i = 1,2,\ldots, n) .$$

Theorem 3: In order that (5) - (6) is solvable for arbitrary $A_1, \ldots, A_n$ and an arbitrary continuous $f(t)$ it is necessary that

$$\sum_{k=1}^{n} \frac{1}{2^k k \left[\frac{k-1}{2}\right]! \left[\frac{k}{2}\right]!} P_k h^k \leq 1 \qquad (9)$$

is satisfied.

Theorem 3 is proved with the aid of theorem 2. With the aid of theorem 2 it is stated (theorem 4) that if the right-hand side of

$$x^{(n)} = f(t,x,x',\ldots, x^{(n-1)}) \qquad (10)$$

satisfies the condition

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Some evaluations of a ...

$$|f(t,v_0,v_1,\ldots,v_{n-1}) - f(t,u_0,u_1,\ldots,u_{n-1})| \leq \sum_{k=0}^{n-1} P_{n-k}\,|v_k-u_k|$$

and besides (9), then (10) has at most one solution which satisfies (6).

The author thanks his leader M. A. Krasnosel'skiy. He mentions S. N. Bernshteyn and V. G. Maz'ya. There are 2 Soviet-bloc and 2 non-Soviet-bloc references.

PRESENTED: December 20, 1960, by A. N. Kolmogorov, Academician

SUBMITTED: December 17, 1960

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S/020/61/141/006/001/021
C111/C333

K.3406

AUTHOR: Levin, A. Yu.

TITLE: The stability of solutions of second order equations

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 6, 1961, 1298-1301

TEXT: Theorem 1: Let the function $f(v_1, v_2, v_3)$ be non-increasing in v_1. Assume that the functions $x_1(t)$ and $x_2(t)$ satisfy the conditions

$$\ddot{x}_1 = f(t, x_1, \dot{x}_1) \quad (t \geqslant t_1), \tag{1}$$

$$\ddot{x}_2 \leqslant f(t, x_2, \dot{x}_2) \quad (t \geqslant t_2 \geqslant t_1) \tag{2}$$

$$x_1(t_1) = x_2(t_2), \quad \dot{x}_1(t_1) \geqslant \dot{x}_2(t_2) \geqslant 0. \tag{3}$$

Let $t_3 (t_1 < t_3 \leqslant \infty)$ be the maximum point next t_1 from the right of the function $x_1(t)$. Let $x_2(t) \geqslant x_2(t_2)$ on the interval $[t_2, t_4]$. Then

$$x_2(t) < x_1(t_3) \quad (t_2 < t \leqslant t_4) \tag{4}$$

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The stability of solutions of second ...

Corollary: Let $-g(v_1, v_2, v_3) \geq av_2 + bv_3$ ($a > 0$, $b \geq -2\sqrt{a}$) for nonnegative v_2 and v_3; the solution $x(t)$ ($x(t_0) = 0$) of the equation $\ddot{x} = g(t,x,\dot{x})$ is assumed to be nonnegative on $[t_0, t_1]$. Then it holds

$$x(t) \leq \begin{cases} \frac{1}{\sqrt{a}} \dot{x}(t_0)\, e^{-\gamma/\operatorname{tg}\gamma} & \text{for } 1 \geq \frac{b}{2\sqrt{a}} = \cos\gamma,\ 0 \leq \gamma < \pi; \\ \frac{1}{\sqrt{a}} \dot{x}(t_0)\, e^{-\gamma/\operatorname{th}\gamma} & \text{for } 1 < \frac{b}{2\sqrt{a}} = \operatorname{ch}\gamma \end{cases} \qquad (5)$$

for $t_0 \leq t \leq t_1$. The stability of the solutions of

$$\ddot{x} + p(t)\,\dot{x} + q(t)\,x = 0 \qquad (7)$$

is considered, where the coefficients $p(t)$, $q(t)$ are piecewise continuous on (t_0, ∞).

Theorem 2: Let $q(t) \geq 0$, and let the solutions of (7) be nonoscillating.

Then: a.) in order that all solutions of (7) be bounded on (t_0, ∞), it is necessary and sufficient that

$$\int_{}^{\infty} \exp\left(-\int_{}^{t} p(\tau)\, d\tau\right) dt < \infty ; \qquad (8)$$

is satisfied; b.) in order that all solutions of (7) tend to zero for $t \to \infty$, it is necessary and sufficient that (8) holds and that the condition

$$\int_{}^{\infty} dt \int_{s}^{t} q(s) \exp\left(-\int_{s}^{t} p(\tau)\, d\tau\right) ds = \infty \qquad (9)$$

is satisfied.

Theorem 3: In order that (7) possesses a fundamental system of solutions of the kind $x_1(t) = o(1)$, $x_2(t) = 1 + o(1)$ it is sufficient, and if

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