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[illegible], S.

"[illegible] Industry", [illegible], ([illegible]), [illegible] 1954, Warsaw, Poland)

SO: [illegible] March 1955, Uncl.

[illegible], [illegible].

[illegible], [illegible]. Discussing the development of [illegible] electric [illegible] in the 5-Year Plan. [illegible] [illegible], no. [illegible], [illegible].

SOURCE: East European Accessions List (EEAL) [illegible] Vol. [illegible], No. [illegible] June 1956

APPROVED FOR RELEASE: 09/24/2001 CIA-RDP86-00513R000514920012-7"

L 13866-65 [illegible]

EWA(h)/EWA(c) [illegible]

S/0181/65/007/003/0931/0933

ACCESSION NR: AP5006915 [illegible]

AUTHOR: [illegible]

TITLE: Influence of high pressure on the photoconductivity of some semiconductors

SOURCE: Fizika tverdogo tela, v. 7, no. 3, 1965, 931-933

TOPIC TAGS: semiconductor, photoconductivity, pressure effect, temperature effect, forbidden band

ABSTRACT: The authors investigated the influence of hydrostatic pressure up to 6000 atm on the photoconductivity of [illegible] Cu_2O, [illegible] PbI_2, and [illegible] the equipment [illegible] described by the authors earlier [illegible] (Crystal Properties) [illegible] 1959 [illegible] is shown to [illegible] the width of the forbidden band [illegible] and [illegible] in the case of Cu_2O and decrease [illegible] increase with increasing [illegible] in the case of [illegible] and PbI_2. The coefficients of variation of the width of the for- [illegible]

Card 1/2

L 5186-65 [illegible]
EWA(h)/EWA(c) [illegible]

S/0181/65/007/003/0931/0933

ACCESSION NR: AP5006915

AUTHOR: [illegible] A. I.; [illegible] A. [illegible]; Kirs, Ya. Ya.

TITLE: Influence of high pressure on the photoconductivity of some semiconductors

SOURCE: Fizika tverdogo tela, v. 7, no. 3, 1965, 931-933

TOPIC TAGS: semiconductor, photoconductivity, pressure effect, temperature effect, forbidden band

ABSTRACT: The authors investigated the influence of hydrostatic pressure up to 6000 atm on the photoconductivity of [illegible] [illegible] The equipment used was similar to that described by the authors earlier [illegible] [illegible] (Crystal Phosphors)), Moscow, [illegible] is shown to shift the [illegible] The width of the forbidden band [illegible] and by approximately the same amount [illegible] in the case of Cu_2O and decrease in the case of HgI_2 and PbI_2. The coefficients of variation of the width of the for- [illegible]

Card 1/2

82727

Regulation of a Neural Pulse Stream in the Auditory System

S/046/60/006/003/003/012
B006/B063

area of the cortex attains amplitudes of up to 70 µv, and the dependence of the amplitudes on the sound intensity decreases rapidly (Curve 3). Next, the author discusses special electric reaction diagrams which were taken under different conditions, and studies the effects of disturbances (e.g., anesthesia, partial destruction of the auditory area of the cortex). The results discussed here were, for the major part, published by Ya. A. Al'tman. They illustrate the importance of the various ways of impulse regulation in the organism. 1) The current of impulses resulting from an acoustic stimulation in a nerve is limited. The secondary current caused by this current are also limited. 2) The current of impulses resulting from the action of a special system of (reverse) connections radiating from the center is limited. 3) The current of inpulses in the higher ranges of the auditory system changes under the action of sections of the central nervous system outside the auditory system. The author discusses two mechanisms of the regulation of information transmitted by currents of nervous impulses which may occur in the auditory system under the action of sound. The first mechanism consists in a change of the participating elements, and the second one in a change of the level of the characteristic noise in the system. Mention is made of Nikolay Nikolayevich Andreyev and

Card 2/3

82727

Regulation of a Neural Pulse Stream in the Auditory System

S/046/60/006/003/003/012
B006/B063

A. M. Maruseva. There are 5 figures and 24 references: 13 Soviet and 3 US.

ASSOCIATION: Institut fiziologii im. I. P. Pavlova Leningrad (Institute of Physiology imeni I. P. Pavlov, Leningrad)

SUBMITTED: May 18, 1960

Card 3/3

GERSHUNI, G.V.

Evaluation of the functional significance of electrical responses of the auditory system. Responses to short sounds (clicks) and the determination of the initial moment of the stimulus action. Fiziol. zhur. 48 no.3:241-250 Mr '62. (MIRA 15:4)

1. From the Laboratory of Auditory Analyser Physiology, I.P.Pavlov Institute of Physiology, Leningrad.
(HEARING) (ELECTROPHYSIOLOGY)

KUZIN, A.M., glav. red.; GEL'FAND, I.M., red.; LIVANOV, M.N., red.; GERSHUNI, G.V., doktor med. nauk, red.; KHURGIN, Ya.I., doktor fiz.-matem. nauk, red.; KOCHEREZHKIN, V.G., kand. biol. nauk, red.; GURFINKEL', V.S., red. izd-va; POLENOVA, T.P., tekhn.red.

[Biological aspects of cybernetics]Biologicheskie aspekty kibernetiki; sbornik rabot. Moskva, Izd-vo Akad. nauk SSSR, 1962. 237 p. (MIRA 16:1)

1. Akademiya nauk SSSR. Nauchnyy sovet po kompleksnoy probleme "kibernetika." 2. Chlen-korrespondent Akademii nauk SSSR (for Kuzin, Gel'fand, Livanov).

(CYBERNETICS)

GERSHUNI, G.V.

Evoked potentials and mechanisms of discrimination of an external signal. Zhur. vys. nerv. deiat. 13 no.5:882-890 S-O'63 (MIRA 16:11)

1. Laboratory of Acoustic Analyser Physiology, Pavlov Institute of Physiology, U.S.S.R. Academy of Sciences, Leningrad.

GERSHUNI, G.V.; SHEV[illegible]EV, [illegible]; [illegible]

Dependence of the primary response of the auditory region of the cortex in cats in a waking state on temporal parameters of the signal. Zhur. vys. nerv. deiat. 14 no.3:[illegible]-497 My-Je '64. (MIRA 17:11)

1. Laboratoriya fiziologii slukhovogo analizatora Instituta fiziologii im. I.P. Pavlova AN SSSR.

BIBIKOV, Ye.S., kand. tekhn. nauk (Chelyabinsk); GERSHUNI, G.V., prof.

Is our ear a radio loudspeaker? Priroda 53 no.9:124-125 '64. (MIRA 17:10)

1. Institut fiziologii im. I.P. Pavlova (for Gershuni).

GERSHUNI, G.V.

Organization of afferent flow and the process of [illegible] of signals of various duration. Zhur. vys. nerv. deiat. 15 no.2: 260-273 Mr-Ap '65. (MIRA 18:5)

1. Institut fiziologii imeni I.P. Pavlova AN SSSR, Leningrad.

GERSHUNI, G. Z.

1 Oct 52

USSR/Physics - Heat Transfer

"Free Thermal Convection in Space Between Vertical Coaxial Cylinders," G. Z. Gershuni, Molotov State Univ imeni Gor'kiy

DAN, Vol 86, No 4, pp 697-8

Investigates thermal convection in a liquid between coaxial cylinders at different temperatures. Finds that heat transfer from hot to cool cylinder depends on molecular thermal conductivity of liquid. It holds true as ling as Gr. Pr 13 (Prandl-Grasshof number). Ovee this limit solution is unstable and tmrbulence occurs. Presented by Acad M. A. Leontovich 3 Jul 52.

252T96

GERSHUNI, G. Z.

"Sound Absorption in a Ferromagnetic Near the Curie Point," Uch. zap. Molotvsk. un-ta', No 1, pp 69-71, 1953

Anomalously high sound absorption in a ferromagnetic near the Curie point, due to energy dissipation of the sound wave, is analyzed. A formula of linear absorption is derived. (RZhFiz, No 6, 1955)

Sum. No. 681, 7 Oct 55

GERSHUNI, G. Z.

2797. NEKOTORYS SOPROSY USTOYCHIROSTI STATSIONARNYKH KONVEKTIVNYKH DEIZHENIY. MOLOTOV, 1954,
9C 2L CH. (M-VO VYSSH. OBRAZOVANIYA SSSR. MOLOTOVSKIY GOS. UN-T IM. A. M. GOR'KOGO)
100 EKZ. B. TS. - (54-56626)

SO: KNIZHANAYA LETOPIS, VOL. 2, 1955

GERSHUNI, G. Z., and Gerasimova, S. B.

"A Certain Case of Solution of Convection Problem With Account of Ratio of Viscosity Coefficient to Temperature"
Uch. Zap Molotovsk. un-ta, 8, No 3, 1954, 87-90

Equations of convection are solved taking into account of the viscosity in the case of an infinite vertical slit with plane parallel walls heated to different temperatures. Exact stationary solutions are found in two cases in which the ratio of viscosity to temperature is linear and may be expressed by Bachinskiy's formula. The temperature distribution in this case is linear and the heat transfer from hot to cold wall is determined by the molecular heat conductivity of the liquid. (RZhFiz, No 9, 1955)

SO:: Sum-No 787, 12 Jan 56

GERSHUNI, G. Z.

"Certain Problems of the Stability of Stationary Convective Movements." Cand Phys-Math Sci, Molotov State U, Min Higher Education USSR, Molotov, 1954. (KL No 2, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556, 24 Jun 55

USSR/Physics - Convective movement stability FD-3051

Card 1/2 Pub. 153 - 20/23

Author : Gershuni, G. Z.

Title : Problem of the stability of planar convective movement of a liquid

Periodical : Zhur. tekh. fiz., 25, February 1955, 351-357

Abstract : Earlier the author investigated (ibid., 23, 1838, 1953) the stability of stationary convective movement of a liquid between vertical parallel planes heated to different temperatures or between planes arbitrarily oriented relative to the gravitational field, the investigation showing that for various angles of inclination the crisis of stationary movement occurs for different causes; further, this problem is of interest for its own self since it relates to the practical important problem of heat transfer through liquid or gas layers. In the present work the author considers the convective movement of a liquid in the portion of a planar slot remote from the ends which is formed by two planes between which is maintained a constant temperature difference T. He drives

Card 2/2 FD-3051

Abstract : the related equations and solves. He clarifies that the so called threshold of convection is a special case of the occurrence of turbulence, as noted by V. S. Sorokin (Prikl. mat. i mekh., 18, 197, 1954). He thanks V. S. Sorokin for discussions. Seven references: e.g. V. S. Sorokin, Prikl. mat. i mekh., 17, 39, 1953.

Institution : -

Submitted : June 25, 1954

SOV/139-58-4-6/30

AUTHORS: Gershuni, G. Z. and Zhukhovitskiy, Ye. M.

TITLE: Two Types of Unstable Convective Flow Between Parallel Vertical Planes (O dvukh tipakh neustoychivosti konvektivnogo dvizheniya mezhdu parallel'nymi vertikal'nymi ploskostyami)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika, 1958, Nr 4, pp 43-47 (USSR)

ABSTRACT: The stability of stationary convective flow between parallel vertical planes held at different temperatures has already been investigated by the first author, using Galerkin's method (Ref.1). In the present paper the authors have used a more complicated form for the approximating functions (see Eqs.5), and have so found a more accurate approximate solution. This has allowed a more accurate calculation of the earlier results and has in addition uncovered a second type of instability, not given in the earlier work at all, a type with null phase velocity which the authors call a "standing disturbance" as opposed to a "travelling disturbance". Taking the planes to be $x = \pm 1$, the dimensionless equations for stationary convective flow are given by Eq.(1). The

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Two Types of Unstable Convective Flow Between Parallel Vertical Planes

stream and temperature functions φ and θ of plane harmonic disturbances are given by Eqs.(2) and (3) with boundary conditions as in Eq.(4). G and P are the Grasshof and Prandtl numbers, k and ω the wave number and complex frequency of the disturbance. These equations were derived by the first author (Ref 1). The question of stability has thus been reduced to that of finding the eigen-values of equations (2) to (4). The authors find an approximate solution to this problem by assuming forms for φ and θ of the type given in Eq.(5). They then make plausible guesses at φ_1, φ_2, θ_1, θ_2, see Eqs.(6) and (8). All boundary conditions are now satisfied by the approximate solution. This solution differs from the cruder approximation the first author used previously (Ref 1) in that the stream function φ is now the sum of two functions, with two variable coefficients, and that the additional boundary condition on θ, Eq.(7), is taken into account. Using Galerkin's method, the authors obtain Eq.(12) for real eigen values of ω, and Eq.(11) for the corresponding relation between G and k. Eliminating ω between

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Two Types of Unstable Convective Flow Between Parallel Vertical Planes

Eq.(11) and Eq.(12), a curve is obtained in the (G,k) plane which the authors call a 'neutral curve' - i.e. one corresponding to real values of ω. From the position of the minimum on this curve the critical values of the Grasshof number G_m and the wave number k_m can be found. $\omega = 0$ gives a solution of Eq.(12), and the corresponding curve of G_m against log P is shown in Fig.1. In the range shown k_m was practically constant, increasing only from 1.6 to 1.7. This is the instability that was not revealed in the earlier work (Ref 1). Excluding $\omega = 0$, for $P > 1.8$ the authors obtain the second type of instability - the "travelling" type. For this type log G_m is plotted against log P in Fig.2 (full line). Eq.(14) is asymptotically true, and a good approximation for $P > 50$. For this type k_m increases from 0 to 1.6 at $P > 50$. For this type of disturbance there is a good agreement with the author's earlier work (Ref 1). Thus eq.(14) was also obtained, though with 224 instead of 214 in the numerator, and the asymptote was reached at $P = 0.96$.

Card3/4 The main results can be summarised thus:

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Two Types of Unstable Convective Flow Between Parallel Vertical Planes

For convective flow between two parallel planes held at different temperatures, instabilities appear if there is a large temperature difference between the planes. "Standing" disturbances correspond to $P < 1.8$, both types are possible for $P > 1.8$, though for $P > 2.2$ the "travelling" disturbances are the more dangerous as they correspond to a smaller Grasshof number.

There are 2 figures and 1 Soviet reference.

ASSOCIATIONS: Permskiy gosuniversitet (Perm' State University) and Permskiy pedagogicheskiy institut (Perm' Pedagogic Institute)

SUBMITTED: January 8, 1958

Card 4/4

SOV/126-6-2-22/34

AUTHORS: Gershuni, G. Z. and Zhukhovitskiy, Ye. M.

TITLE: Forced Vibrations in an Elasto-Plastic System (Vynuzhdennyye kolebaniya v uprugo-plasticheskoy sisteme)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 2, pp 339-346 (USSR)

ABSTRACT: Forced vibrations in an elasto-plastic system beyond the elastic limit are considered. Friction and hysteresis are taken into account. The resonance properties of such a system are discussed and compared with the experimental data given in Refs. 1 and 2. The equation of motion of a point under the action of an elasto-plastic force F(x) and an external force G sin (ωt + φ) is of the following form

$$m\ddot{x} + \lambda\dot{x} + F(x) = G \sin(\omega t + \varphi) \quad (2)$$

where λ is the coefficient of friction and F(x) is given by:

$$\left.\begin{aligned} F_I = k_1 x,\ F_{II} = F_m + k_2(x - x_m), \\ F_{III} = k_1(x - \Delta),\ F_{IV} = -F_m + k_2(x + x_m - \Delta). \end{aligned}\right\} \quad (3)$$

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where the various constants have the meaning indicated in Fig.1. The above equation is then re-written in the dimensionless form

$$\ddot{x} + \beta\dot{x} + f(\lambda) = g \sin (pt + \varphi) \qquad (4)$$

where

$$p = \omega/\omega_0, \; g = G/F_m, \; \beta = \lambda/m\omega_0, \; f + F/F_m$$

$$\left.\begin{aligned} &f_I = x, \quad f_{II} = 1 + \alpha (x - 1), \\ &f_{III} = x - \delta, \; f_{IV} = -1 + \alpha (x + 1 - \delta), \end{aligned}\right\} \qquad (5)$$

$$\delta = \frac{\Delta}{x_m} \quad \text{and} \quad \alpha = \frac{k_2}{k_1} \; .$$

The problem consists of finding periodic solutions of the above equation which have a period $2\pi/p$, i.e. equal to the period of the forcer. The appropriate system of boundary conditions is given by Eq.(6). The equations are solved by an approximation method suggested by B. G. Galerkin.

In the case $\beta = 0$ the resonance curves are as shown in Figs. 2 and 3 ($\alpha = k_2/k_1$; cf. Fig.1). The form of the curves indicates the presence of considerable absorption due to hysteresis. The assymmetry of the curves becomes more pronounced as α decreases. The low frequency side of the resonance curve is steeper than the high frequency side. When the coefficient of friction is not zero the resonance frequency beyond the elastic limit increases as friction increases. In general, the resonance frequency decreases at larger amplitudes of vibration and the relation between the amplitude of vibration and the amplitude of the forcing function is non-linear. The problem was suggested by Professor M. Kornfel'd. There are 7 figures and 4 references, 3 of which are Soviet, 1 English.

Forced Vibrations in an Elasto-Plastic System SOV/126-6-2-22/34

ASSOCIATIONS: Permskiy gosudarstvennyy universitet
(Perm' State University) and
Permskiy pedagogicheskiy institut
(Perm' Pedagogical Institute)

SUBMITTED: June 7, 1956

Card 4/4 1. Vibration--Theory 2. Mathematics--Applications

APPROVED FOR RELEASE: 09/24/2001 CIA-RDP86-00513R000514920012-7"

AUTHORS: Gershuni, G. Z., Zhukhovitskiy, Ye. M. SOV/ 56-34 -3-20/55

TITLE: The Stationary Convective Motion of an Electrically Conducting Liquid Between Parallel Surfaces in a Magnetic Field (Statsionarnoye konvektivnoye dvizheniye elektroprovodyashchey zhidkosti mezhdu parallel'nymi ploskostyami v magnitnom pole)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 670-674 (USSR)

ABSTRACT: The two planes referrred to in the title may be heated to various temperatures. First, the equations of the motion of the medium (these are the equations of convection in the case investigated here) and the Maxwell equations for the field in the medium are written down. In the equation for the curl of the magnetic field, the displacement current is neglected and in the equation of heat conduction - the tough dissipation and Joule dissipation. The electric field strength and the current density are eliminated first from Maxwell's equation. The above-mentioned equations are subsequently converted into dimensionless variables. 4 dimensionless parameters occur in these equations. The authors investigate here the steady

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SOV/56-34-3-20/55

The Stationary Convective Motion of an Electrically Conducting Liquid Between Parallel Surfaces in a Magnetic Field

convection in the space between vertical parallel surfaces in the case of the presence of an exterior magnetic field which is vertical to the surfaces. If the linear dimensions of the surfaces are sufficiently great compared with the distance between them, then an accurate solution of the above-mentioned dimensionless equations can be determined which describes the steady solution in the part distanced from the ends of the gap formed by the surfaces. This motion has the following pecularities: 1) The velocity $\vec{v}$ is always parallel to the z-axis. 2) The temperature T depends only on x. 3) The field-vector $\vec{H}$ is situated everywhere in the surface (xz), viz. it holds $H_y = 0$; 4) All values do not depend on y (plane problem) and except pressure, neither on z. In this case the z-axis is parallel to the surfaces and the x-axis is vertical to them. The authors determine here the distribution of temperature, velocity and field strength on the cross section. First, T = -x is found. Also the terms for the velocity distribution and the magnetic field strength are given explicitely; all these formulae together represent the solution of the problem discussed here. A diagram demonstrates the velocity-distributions for the Gartman numbers M = 0,5,10.

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SOV/56-34-3-20/55

The Stationary Convective Motion of an Electrically Conducting Liquid Between Parallel Surfaces in a Magnetic Field

The velocitydistribution $v = Gx(x^2 - 1)/6$ is obtained with lacking field. The motion decreases rapidly with increasing field strength. Moreover, a peculiar boundary layer occurs in the flow: A thin layer with an important gradient of velocity is formed in the vicinity of the walls. Also the distribution of the induced magnetic field on the cross section is demonstrated by a diagram. Concluding, a formula for the vertical convective thermic flow is given. The solution found here describes the motion in a vertical gap in the presence of a transversal external field. It may, however, be readily generalized for cases with inclined gap and with an external field oriented at random. There are 2 figures and 3 references, 1 of which is Soviet.

ASSOCIATION: Permskiy gosudarstvennyy universitet (Perm State University), Permskiy pedagogicheskiy institut (Perm Pedagogical Institute)

SUBMITTED: September 19, 1957

Card 3/3

AUTHORS: Gershuni, G. Z., Zhukhovitskiy, Ye. M. SOV/56-34-3-21/55

TITLE: On the Stability of Steady Convective Motion of an Electrically Conducting Liquid Between Parallel Vertical Planes in a Magnetic Field (Ob ustoychivosti statsionarnogo konvektivnogo dvizheniya elektroprovodyashchey zhidkosti mezhdu parallel'nymi vertikal'nymi ploskostyami v magnitnom pole)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 675-683 (USSR)

ABSTRACT: First the authors refer to earlier works dealing with the same subject among them one published by themselves (Ref. 1). The generalization to the case of random position of the planes is more difficult than in the case of the steady problem and it can be carried out **in the same way as G.Z. Gershuni in his study** (Ref. 5). First the equations for the perturbations are put down, the authors here investigating two-dimensional perturbations. Also a current function and a vector potential are introduced. The sign of the imaginary

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part of the frequency ω determines the behaviour of small perturbations. The authors then mention the differential equations for the amplitudes of the perturbations of velocity and temperature must disappear in the parallel boundary planes bounding the liquid; the corresponding boundary conditions are put down. The perturbations of the magnetic field need, in general, not disappear; as boundary conditions for the field serve the usual conditions on the separating surfaces of the media. Furthermore two possible orientations of the constant external field are investigated:
1.-The constant homogenous external field is situated at right angles to the parallel planes and thus also to the vector of the velocity of the steady motion of the liquid.
2.-The external field has the same direction as the velocity. With longitudinal and also with transverse fields the amplitude of the vector potential of the perturbation of the field can be eliminated from the equations. The problem then reduces to the finding of the amplitudes of the current function and of temperature from the given equations of the problem and the boundary conditions pertaining to it.

On the Stability of Steady Convective Motion of an Electrically Conducting Liquid Between Parallel Vertical Planes in a Magnetic Field

SOV/56-34-3-21/55

This problem will have a solution only for certain values of the complex number ω. In the second chapter of this work the problem formed is solved by approximation according to the method by Galerkin, the course of computation being followed step by step. The results obtained are discussed separately for the case of a longitudinal and a transverse field. In the transverse case the critical wave number k_m decreases monotonously with increasing M i.e. with the magnetic field becoming stronger the wave length of the steady perturbations increases. Besides, the investigated steady motion is unstable also with regard to nonsteady perturbations when a transverse field is present. Such a instability appears at sufficiently great field strengths. A diagram shows the dependence of the critical wave number on the field strength. In the case of a longitudinal field the stability can be compensated only by steady perturbations with $\omega = 0$. A longitudinal field increases the stability of motion

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On the Stability of Steady Convective Motion of an Electrically Conducting Liquid Between Parallel Vertical Planes in a Magnetic Field

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much less than a transverse field. In a longitudinal field the critical wave number decreases monotonously with increasing field strength. The qualitative results obtained can be made more precise by their approximation method used. There are 2 figures, 1 table and 9 references, 4 of which are Soviet.

ASSOCIATION: Permskiy gosudarstvenny universitet (State University Perm), Permskiy gosudarstvennyy pedagogicheskiy institut (Perm State Pedagogic Institute)

SUBMITTED: September 19, 1957

Card 4/4

GERSHUNI, G.Z.

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems of Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 543 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Veldre, Candidate of Physics and Mathematics; V.G. Vitol, Candidate of Physics and Mathematics; Yu.M. Krumin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magnetohydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 33 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and A.I. Gubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

Card 9/12

24(8)

AUTHORS: Gershuni, G. Z., Zhukhovitskiy, Ye. M. SOV/20-124-2-15/71

TITLE: A Closed Convective Boundary Layer (Zamknutyy konvektivnyy pogranichnyy sloy)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 2, pp 296-300 (USSR)

ABSTRACT: The present paper solves the problem of the closed convective boundary layer in a horizontal circular cylinder. The surface of the cylinder with a radius R is kept at the temperature $T_0 = \Theta \sin x$, where x denotes the coordinate along the circle and Θ a time-constant amplitude. The temperature assumed to be homogeneous in the core is considered to be the temperature of reference. The core is assumed to rotate as a solid at the rate $v_\varphi = \omega r$, where the angular velocity ω is required. The boundary layer equations (in disregard of the curvature of the layer and with introduction of dimensionless variables) are:

$$v_x \frac{\partial v_x}{\partial x} + v_y \frac{\partial v_x}{\partial y} = \frac{\partial^2 v_x}{\partial y^2} + G \sin x\, T$$

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$$v_x \frac{\partial T}{\partial x} = v_y \frac{\partial T}{\partial y} = \frac{1}{Pr} \frac{\partial^2 T}{\partial y^2} \; ; \quad \frac{\partial v_x}{\partial x} + \frac{\partial v_y}{\partial y} = 0 \; .$$

Here $G = g\beta \Theta R^3/\nu^2$ denotes the Grasskhof number and $Pr = \nu/\chi$ the Prandtl number. The velocity layer and the temperature layer are assumed to have the same thickness $\delta(\delta \ll 1)$. The temperature and the velocity on the surface of the cylinder and on the boundary layer against the core are assumed to satisfy the usual boundary conditions, besides which there is a number of additional conditions. Besides, temperature and velocity must, as function of x, satisfy the condition of cyclisity. The approximated solution of the above equations is set up in the form

$$v_x = \bar{\omega}(P_1 + P_2 \cos 2x + \beta P_3 \sin 2x), \; T = Q_1 \sin x + \alpha Q_2 \cos x \; .$$

The functions written down above have the necessary periodicity with respect to x. The coefficients P and Q can be selected as polynomials of y in such a manner that they satisfy the above conditions. The polynomials are also explicitly written down.

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The authors do not give the entire calculations but only the final formulas: $\omega = 0.629 (\nu/R^2)(G/Pr)^{1/2}$; $\delta = 4.34\, R (G\, Pr)^{-1/4}$; $\alpha = -2.59$; $\beta = -(4.03 + 1.55/Pr)$. By means of the formulas derived it is possible to calculate the density of the heat flow on any point of the surface. Finally, a formula is given for the total heat current passing through the cross section. The condition for the existence of the investigated convective motion is $G Pr \gg 350$. At low values of the Rayleigh (Reley)- parameter G Pr there is a weak convection without the formation of a boundary layer. There are 1 figure and 4 references, 1 of which is Soviet.

ASSOCIATION: Permskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Perm' State University imeni A. M. Gor'kiy) Permskiy pedagogicheskiy institut (Perm' Pedagogical Institute)

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GERSHUNI, G. Z., ZHUKHOVITSKIY, E. M. (Perm)

"On the Motion of an Electrically Conducting Fluid Surrounding a Rotating Sphere in the Presence of a Magnetic Field."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

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AUTHORS: Gershuni, G. Z., Zhukhovitskiy, Ye. M.

TITLE: Heat Transfer Through a Vertical Gap With Rectangular Cross Section in the Case of Strong Convection

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 12, pp. 63-67

TEXT: It is assumed that in the rectangular gap investigated in the present paper, the temperatures of its vertical walls are constant and amount to $-\theta$ and $+\theta$. In the horizontal cross sections the temperature changes from $-\theta$ to $+\theta$. First, the flow function is derived, the boundary layer being assumed to be considerably thinner than the thickness d and the height h of the gap. Next, the motion in the boundary layer is investigated. A system of equations for the velocity and the temperature of a liquid in the gap is given and approximate solutions are obtained. As a condition for the applicability of the approximate solutions obtained here, $GrPr \gg 50\ell^{3/2}$, where Gr is the Grasshoff number, Pr the Prandtl

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number, and $\ell = h/d \gg 1$. Finally, a formula for the heat transfer through the gap is obtained. System of equations for velocity and temperature of the liquid:

$$v_x \partial v_x/\partial x + v_y \partial v_x/\partial_y = UdU/dx + \partial^2 v_x/\partial y^2 - Gr\gamma(x)T \qquad (5)$$

$$v_x \partial T/\partial x + v_y \partial T/\partial y = (1/Pr)\partial^2 T/\partial y^2 \qquad (6)$$

$$\partial v_x/\partial x + \partial v_y/\partial y = 0 \qquad (7)$$

The approximate solutions are:

$$v_x = p_0(z) + p_1(z)U(x) + p_2(z)\cos\frac{2\pi x}{l+1} \qquad (8)$$

$$T = q_1(z)T_0(x) + q_2(z)\cos\pi x/(l+1) \qquad (9)$$

$\gamma(x)$ is a function, which for the upper and the lower wall of the gap is 0, for the lateral walls -1 or +1. $z = y/\delta$, where δ is the thickness of the boundary layer, the coefficients p_i and q_i must be taken as polynomials corresponding to the boundary conditions. For the heat transfer through

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the gap the relation

$$Q = -\kappa \int_a^b (\partial T/\partial y)_0 dx = 0.730\kappa(GrPr)^{1/4} l^{9/8}$$

was obtained. There are 1 figure and 4 references: 3 Soviet.

ASSOCIATION: Gosudarstvennyy universitet, Gosudarstvennyy pedagogicheskiy institut, g. Perm' (State University, State Pedagogical Institute, Perm')

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