APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

upon the angles and upon time has to be taken into account. The authors give an expression for the initial density and then introduce a dimensionless temperature. Next, the problem is linearized, in which case certain quantities are looked upon as small. Because of the linearity of the theory the determination of a solution which corresponds to a harmonic and the use of a superposition principle suffice. The variables in the equation may be separated for the small quantities. For a function $H(\eta)$ occurring here a linear ordinary differential equation of second order is obtained. The temperature at the wave front according to an assumed theorem has here to tend towards zero (boundary condition). The solution of this equation can be set up as a sum. In first approximation the wave front contains no other harmonics than that which enters into the development of density. Next, the coefficient of asymptotic development is computed. By means of the condition for the preservation

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of energy an expression for Q on the coordinates of the wave at a given point of time is obtained. There are 3 Slavic references.

ASSOCIATION: Chemical-Physical Institute AN USSR (Institut khimicheskoy fiziki Akademii nauk SSSR).

PRESENTED: By M. A. Lavrent'yev, Academician, March 15, 1957

SUBMITTED: March 4, 1957

AVAILABLE: Library of Congress

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

AUTHOR: Ryzhov, O.S. (Moscow) 40-22-2-16/21

TITLE: Some Degenerated Flows Near the Sound (Nekotoryye vyrozhdennyye okolozvukovyye techeniya)

PERIODICAL: Prikladnaya matematika i mekhanika, 1958, Vol 22, Nr 2, pp 260-264 (USSR)

ABSTRACT: The author considers some special cases of flows near the sound of an ideal gas, for which partial solutions of the initial differential equations can be found. At first spatial flows are considered for which the velocity distribution is degenerated. From the equations near the sound which are valid for the general spatial motion the system of equations is reduced to a partial differential equation of the form

$$(uu_v^2 - 1)v_y + 2uu_v u_w v_z + (uu_w^2 - 1)w_z = 0$$

by consideration of waves in two different directions. With the aid of coordinate transformations now special cases can be solved. At first axial-symmetric flows are investigated, while well-known plane solutions of the problem can be found on the other hand. By superposition of the two special solutions more general problems can be solved.

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In the second part of the paper the author investigates the conditions for the existence of similar flows, and that for axial-symmetric flows as well as for plane flows. In this way also the line of transition from the subsonic to the supersonic can be explicitly calculated.
There are 1 figure, and 7 references, 4 of which are Soviet, 2 American, and1 German.

SUBMITTED: September 6, 1957

1. Gas flow--Mathematical analysis

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

AUTHOR: Ryzhov, O.S. (Moscow) SOV/40-22-3-15/21

TITLE: On Gas Flows in Laval Nozzles (O gazovykh techeniyakh v soplakh Lavalya)

PERIODICAL: Prikladnaya matematika i mekhanika, 1958, Vol 22, Nr 3, pp 396 - 398 (USSR)

ABSTRACT: The author investigates the flow of an ideal gas in a Laval jet. He supposes that the Laval jet possesses two planes of symmetry. He restricts himself to the calculation of the flow in the neighborhood of that surface on which the transition from the subsonic to the supersonic takes place. The starting equations are brought into a suitable form by application of a cylindrical coordinate system. Since only such flows are considered for which no compression shock occurs, only analytic solutions of the starting equation are of interest. In the case of a plane jet and for a circular jet the solutions can be found in a relatively simple way. For the general case of a rectangular or elliptic jet a set up of the form :

(5) $$f = \frac{A}{2}\xi^2 + g_1(\vartheta)\xi + g_2(\vartheta)$$

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is made. For the functions $g_1(\vartheta)$ and $g_2(\vartheta)$ occurring in this set up the following expressions are obtained

$$g_1(\vartheta) = A^2\left(\frac{1}{4} - n\cos 2\vartheta\right)$$

$$g_2(\vartheta) = A^3\left(\frac{1}{64} - \frac{n}{12}\cos 2\vartheta + m\cos 4\vartheta\right)$$

The form of the transition surface now essentially depends on the magnitude of the parameter n occurring in these formulas. The author discusses explicitly this form and shows that the transition surface may be an elliptic paraboloid, a parabolic cylinder or a hyperbolic paraboloid too. There are 3 Soviet references.

SUBMITTED: February 15, 1958

10(2)

AUTHOR: Ryzhov, O.S. (Moscow) SOV/40-22-4-2/26

TITLE: On the Flows in the Neighborhood of the Transition Surface in Laval Nozzles (O techeniyakh v okrestnosti poverkhnosti perekhoda v soplakh Lavalya)

PERIODICAL: Prikladnaya matematika i mekhanika, 1958, Vol 22, Nr 4, pp 433 - 443 (USSR)

ABSTRACT: Starting from a paper of Fal'kovich the author investigates the flows of an impressible gas in a Laval nozzle. Fal'kovich [Ref 3] applied a direct method for this calculation in which the main term of the solution for the flow was obtained in the form of a polynomial of third degree. Thus it was possible to calculate the transition part in the Laval nozzle in which the transition from the subsonic to the supersonic takes place, in an essentially simpler way than it was done till now by other authors. For the case of axial symmetric flow in Laval nozzles with circular cross sections the flow can be represented by a simple integral. Some pecularities of such axial symmetric flows are investigated in the present paper.
The following equations of a cylindrical coordinate system

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$$(1.1) \qquad -(\varkappa+1)UU_x + a_1V_r + a_2\frac{V}{r} = 0 \quad ; \quad U_r = V_x$$

are applied as initial equations. Since it is the question to obtain a solution for the flow which does not lead to a compression shock after the passage through the transition surface, the form of the wall is not given, but the velocity distribution as an analytic function of the local coordinate. It is obtained under consideration of the equation of motion and of the velocity potential corresponding to this equation. Two of the flow lines found in this way which lie symmetrically to the main axis of the nozzle then are considered as ram jet walls.
The given equations are linearized, the obtained gas flows only depend on one parameter. A comparison of results obtained for nozzles with circular cross section with corresponding results for plane nozzles shows that the flow in circular nozzles is more uniform. Therefore it is more suitable in many cases to apply circular-formed nozzles, if a certain presupposed final velocity for the discharge from the nozzle

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

periphery is demanded.
There are 8 figures, and 5 Soviet references.

SUBMITTED: January 5, 1958

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, O.S.; KHRISTIANOVICH, S.A. (Moskva)

Nonlinear reflection of weak shock waves. Prikl.mat. i mekh. 22 no.5:586-599 S-O '58. (MIRA 11:11)
(Shock waves)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, O.S. (Moskva); CHERNYAVSKIY, S.Yu. (Moskva)

Reflection of weak disturbances by the nozzle center. Prikl. mat. i mekh. 23 no.1:86-92 Ja-F '59. (MIRA 12:2)
(Nozzles--Fluid dynamics)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

KATSKOVA, O.N.; KRAYKO, A.N.; RYZHOV, O.S., otv. red.; ORLOVA, I.A., red.

[Calculation of plane and axisymmetrical supersonic flows in the presence of irreversible processes] Raschet ploskikh i osesimmetrichnykh sverkhzvukovykh techenii pri nalichii neobratimykh protsessov. Moskva, VTs AN SSSR, 1964. 42 p. (MIRA 17:6)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

SOV/20-124-1-15/69

24(8)

AUTHORS: Zaydel', M. M., Ryzhov, O. S., Andriankin, E. I.

TITLE: On the Propagation of a Thermal Wave Which is Nearly Spherical (O rasprostranenii teplovoy volny, blizkoy k sfericheskoy)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 1, pp 57-59 (USSR)

ABSTRACT: The influence exercised by slight disturbances on the propagation of a spherical heat wave has already been investigated by a previous paper (Ref 1). The present article shows that the spectrum of the eigenvalues and the corresponding eigenfunctions can be explicitly determined. The equation for the heat input in the case of nonlinear thermal conductivity can be written down in the form

$\frac{\partial W}{\partial t} = \frac{a}{k+1}\nabla^2 \left(W^{k+1} \right)$, where W denotes the volume energy density.

It is useful to introduce the function $F = W^k$, which satisfies the equation $\frac{\partial F}{\partial t} = a\left[F\nabla^2 F + \frac{1}{k}(\nabla F)^2\right]$. First, the quantity of heat Q is supposed to be released at the origin of coordinates. The solution of this similarity problem is explicitly written down. Temperature

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

distribution behind the front of the thermal wave is of the form $F(r.\theta.\varphi.t) = F_o(r.t) + f(r.\theta.\varphi.t)$, where f is small compared to $F_o(r.t)$. In linear approximation the equation

$$\frac{\partial f}{\partial t} = a\left[f\nabla^2 F_o + F_o\nabla^2 f + \frac{2}{k}(\nabla F_o)\nabla f\right]$$ is obtained for f,

and the solution is set up as $f(r.\theta.\varphi.t) = t^{\lambda}\Psi(\xi)Y_n^1(\theta.\varphi)$. Y_n^1 here denotes the spherical harmonics. The equation resulting for Ψ is then given. Non-uniform heating curves the front of the thermal wave. The course of calculation is followed, and the resulting expressions for the eigenvalues and eigenfunctions are written down. The eigenfunctions containing the spherical harmonics Y_n^1 with various indices are orthogonal. Eigenfunctions containing the same harmonic are orthogonal with a weight depending only on the index n. The system of eigenfunctions obtained is complete. The authors thank N. A. Popov for a useful discussion.- There are 5 Soviet references.

SOV/20-124-1-15/69

On the Propagation of a Thermal Wave Which is Nearly Spherical

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute for Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: July 26, 1958, by V. N. Kondrat'yev, Academician

SUBMITTED: July 19, 1958

Card 3/3

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

10(6) SOV/20-128-3-14/58

AUTHORS: Ryzhov, O. S., Shefter, G. M.

TITLE: On Unsteady Flows of Gas in Laval Nozzles

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 485-487 (USSR)

ABSTRACT: The wave equation of acoustics defines the unsteady motions at sonic velocity approximately which rapidly vary within the course of time. If the parameters, however, vary more slowly, the character of the motion largely remains unsteady, and the same nonlinear term is to be retained in the equation for the velocity potential as well as in the conventional theory of steady flows. This article presents an exact solution of this nonlinear equation. This solution is a generalization of the solutions for steady gas flows in the surroundings of the transition surface in Laval nozzles. The latter are herein assumed to possess two planes of symmetry. Under standard conditions, the authors obtained: $-(\varkappa+1)a_* \varphi_x \varphi_{xx} + a_*^2 \varphi_{yy} + a_*^2 \varphi_{zz} - 2a_* \varphi_{xt} = 0$; $a^2 = a_*^2 - (\varkappa-1)a_* \varphi_x$, where it holds:

Card 1/3 $\varphi(x,y,z,t) = \Phi(x,y,z,t) - a_* x$ ($\varphi \ll a_* x$). $\Phi(x,y,z,t)$ denotes

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the velocity potential; x,y,z the Cartesian space coordinate, t the time, a the local velocity of sound, $\varkappa$ the ratio of specific heats. The constant a_* equals the critical sonic velocity. Nondimensional variables are introduced for the solution of this equation, and the operation is briefly outlined. Finally, the following solution is obtained:

$$(\varkappa+1) + \varphi_x = (\varkappa+1)\, v_x/a_* = \lambda + A(x-\Delta) + h_1 r^2$$

$$\varphi_r = (\varkappa+1)\, v_r/a_* = 2h_1(x-\Delta)r + 4h_2 r^3$$

$$\varphi_\vartheta/r = (\varkappa+1)\, v_\vartheta/a_* = h_{1\vartheta}(x-\Delta)r + h_{2\vartheta} r^3$$

Other expressions are written down for the functions λ, h_1 and h_2. The above solution of the equation contains four arbitrary functions of time determining the variation in the size and shape of the nozzle. The authors shortly indicate the particularities of solutions for circular and plane Laval

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nozzles. They further investigate the surface of transition through the sonic velocity which is defined by the equation $\varphi_x = 0$. Herefrom it results

$x = \Delta - \lambda/A - h_1 r^2/A$, which are surfaces of second order

shifted along the nozzle axis. The principal radii of curvature of these surfaces vary within the course of time. The surfaces are parabolic cylinders in plane nozzles, and paraboloids of revolution in round nozzles. This is exemplified by an investigation of the characteristic surfaces intersecting with the nozzle axis. In conclusion, the authors thank G. I. Taganov and S. A. Khristianovich for a discussion and valuable advice. There are 7 references, 4 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

RYZHOV, O. S. (Moscow); GRIB, A. A. (Leningrad) and KHRISTIANOVICH, S. A. (Novosibirsk)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

"Short Wave Theory."

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

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

10.1410
26.2114

31281
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D251/D301

AUTHORS: Grib, A.A., Ryzhov, O.S. and Khristianovich, S.A.

TITLE: Theory of short waves

PERIODICAL: Referativnyy zhurnal. Mekhanika, no. 10, 1961, 28-29, abstract 10 B155 (Zh. prikl. mekhan. i tekhn. fiz, 1960, no. 1, 63-74)

TEXT: Weak shock waves are considered. It is noted that for a series of problems devoted to the interaction of shock waves, acoustic approximations give a qualitatively untrue picture of the phenomena. In many cases of the established motion, sharp changes of the parameters of flow occur in narrow regions adjoining the shock front. Such flows the authors call "short-waves". In the case of plane-parallel flow, the differential equations for dimensionless functions are deduced. Flow not explicitly dependent on time and also some more general flows are considered. The differential equation defining the position of the shock front is deduced. With

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the help of this equation, and making use also of the integrals of the short-wave equations, the authors find the law of motion of the explosive wave. Comparison of the epures thus constructed with those calculated by computer gives satisfactory results. With the help of short-wave theory, the problems of the reflection of shock-waves from a fixed wall and from a free surface are solved. It is assumed that the angle of incidence of the wave is small. [Abstracter's note: Complete translation]

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, O.S (Moskva)

Transition from subsonic to supersonic speeds in Laval nozzles. Prikl. mat. i mekh. 24 no. 2:372-375 Mr-Ap '60. (MIRA 14:5)
(Supersonic nozzles)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

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10.6000

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~~10(5)~~

AUTHORS: Ryzhov, O.S., Shefter, G.M. SOV/20-130-2-9/69

TITLE: Approximate Construction of a Class of Nonsteady Flows With a Velocity Close to the Velocity of Sound

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 276-279 (USSR)

ABSTRACT: Approximate equations for the above-mentioned flows have been studied by many authors. C.C.Lin et al. (Ref 7) derived an equation for the velocity potential of nonsteady transsonic (transzvukovyy) flows for the case in which the flow parameters vary rapidly enough with time. The present paper gives an exact solution of this equation which describes the potential flows without shock waves. These potential flows contain local time-dependent supersonic zones. In this case, the shape of the nozzle is not given but has to be chosen in accordance with the solution obtained. In general, it is also time-dependent. The three-dimensional potential flows of a perfect gas satisfy the equations $\frac{\partial^2 \Phi}{\partial t^2} - a^2 \Delta \Phi + 2 \operatorname{grad} \Phi \operatorname{grad} \frac{\partial \Phi}{\partial t} +$

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67355

$+\frac{1}{2}\,\mathrm{grad}\,\Phi\,\mathrm{grad}\,(\mathrm{grad}\,\Phi)^2 = 0$, $\frac{\partial \Phi}{\partial t} + \frac{1}{2}(\mathrm{grad}\,\Phi)^2 + \frac{a^2}{\varkappa - 1} = \mathrm{const.}$ t = time, Δ = Laplace operator, Φ = velocity potential, a = local sonic velocity, $\varkappa$ = ratio of the specific heats. The authors studied the motion of the gas in the neighborhood of the critical cross section of a Laval nozzle with two planes of symmetry. The particle velocities in the flow were assumed to differ but little from the velocity of sound with respect to their amount, and the angle between the velocity vector and the axis of the nozzle was assumed to be small. After carrying out some transformations, the authors obtained the following equation in cylindrical coordinates:

$$-\frac{\partial \varphi}{\partial x}\frac{\partial^2 \varphi}{\partial x^2} + \frac{\partial^2 \varphi}{\partial r^2} + \frac{1}{r^2}\frac{\partial^2 \varphi}{\partial \vartheta^2} - 2\frac{\partial^2 \varphi}{\partial x \partial \tau} + \frac{1}{r}\frac{\partial \varphi}{\partial r} = 0,$$ where

$\frac{a_*}{\varkappa+1}\varphi(x, r, \vartheta, \tau) = \Phi(x, r, \vartheta, \tau) - a_* x\ (+ \tau a_* x)$ holds. The constant a_* equals the critical sonic velocity. The course of calculation is given. Next, the relations $v_x = \frac{a_*}{\varkappa+1}\frac{\partial \varphi}{\partial x}$; $v_r =$

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Approximate Construction of a Class of Nonsteady Flows With a Velocity Close to the Velocity of Sound SOV/20-130-2-9/69

$= \frac{a_*}{\varkappa+1} \frac{\partial \varphi}{\partial r}$; $v_\vartheta = \frac{a_*}{\varkappa+1} \frac{1}{r} \frac{\partial \varphi}{\partial \vartheta}$ were found. A particular solution of the equation of motion is written down. The remaining solutions of this system may then be expressed by harmonics with the aid of the principle of superposition. The solution found describes the development of local supersonic zones occurring with increasing pressure difference at the inlet and outlet of the nozzle with time-dependent walls. These zones have to be chosen in accordance with the solutions obtained. The supersonic zone that first develops near the tunnel walls in the surroundings of the critical cross section becomes gradually larger. When the above-mentioned pressure difference is sufficiently high, the local supersonic zone touches the tunnel axis. Still more general solutions can easily be obtained. Because of the satisfactory agreement between theory and experiment it is possible to describe nonsteady processes in Laval nozzles by the above-described method. There are 12 references, 6 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

67555

Approximate Construction of a Class of Nonsteady Flows With a Velocity Close to the Velocity of Sound SOV/20-130-2-9/69

Chemical Physics of the Academy of Sciences of the USSR)

PRESENTED: April 14, 1959, by S.A.Khristianovich, Academician

SUBMITTED: March 25, 1959

Card 4/4

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

26732
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10.1200 1327, 2607, 3113

AUTHORS: Ryzhov, O.S., and Shmyglevskiy, Yu.D. (Moscow)

TITLE: On the property of a supersonic gas flow

PERIODICAL: Akademiya nauk SSR. Otdeleniye tekhnicheskikh nauk. Prikladnaya matematika i mekhanika, v. 25, no. 3, 1961, 453 - 455

TEXT: When gas flow in Laval nozzles is investigated, difficulties are encountered in the construction of flow in the vicinity of the narrowest cross-section, where the transition from subsonic to supersonic velocities takes place, as in that region the motion is described by mixed, elliptic-hyperbolic type equations, whose general properties are not well-known. Solving the supersonic part of flow is simplified if the sonic surface is perpendicular to the lines of flow because it also becomes a characteristic surface and the subsonic region is described by elliptic equations, while the supersonic one is described by hyperbolic ones. In this paper, ge-

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neral conditions are derived, necessary for a transition surface to coincide with the characteristic surface of the gas dynamical equations and the case becomes unique, when supersonic and subsonic flows can be considered separately. The equations of gas dynamics are

$$v_j \frac{\partial v_i}{\partial x_j} + \frac{1}{\rho}\frac{\partial p}{\partial x_i} = 0, \quad \frac{\partial \rho v_j}{\partial x_j} = 0, \quad v_j \frac{\partial s}{\partial x_j} = 0 \qquad (1)$$
$$p = p(\rho, s)$$

where v_i, p, ρ, s are components of stream velocity, pressure, density and entropy respectively at the point x_i. (i, j = 1, 2, 3). Equations of $C_\pm$ - characteristic surfaces $x_3 = x_3(x_1, x_2)$ of Eq. (1) are

$$v_j n_j \pm a = 0 \qquad (2)$$

where $a = \sqrt{(\partial p/\partial\rho)_s}$ = velocity of sound, and n_j are components of

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the normal to those surfaces, for which

$$n_1 = \frac{1}{k}\frac{\partial x_3}{\partial x_1}, \quad n_2 = \frac{1}{k}\frac{\partial x_3}{\partial x_2}, \quad n_3 = -\frac{1}{k} \qquad (3)$$

$$k = \sqrt{1 + \left(\frac{\partial x_3}{\partial x_1}\right)^2 + \left(\frac{\partial x_3}{\partial x_2}\right)^2}$$

is valid. Then Eq. (1) becomes

$$(v_i \pm a n_i)\frac{\partial p}{\partial x_i} + a\rho\,(a\delta_{ij} \pm n_i v_j)\frac{\partial v_i}{\partial x_j} = 0 \qquad (4)$$

$$(\delta_{ij} = 1 \text{ при (for) } i = j \text{ и (and) } \delta_{ij} = 0 \text{ при (for) } i \neq j)$$

If $C_{\pm}$ coincides with the sonic surface, then it follows from Eq. (2) that it is orthogonal at all points to the streamlines through those points, and the component of velocity vector tangential to the surface is

$$v_j = \mp a n_j \qquad (5)$$

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$$\frac{\partial}{\partial x_1}\frac{\partial x_3/\partial x_1}{\sqrt{1+(\partial x_3/\partial x_1)^2+(\partial x_3/\partial x_2)^2}}+\frac{\partial}{\partial x_2}\frac{\partial x_3/\partial x_2}{\sqrt{1+(\partial x_3/\partial x_1)^2+(\partial x_3/\partial x_2)^2}}=0 \quad (6)$$

is obtained as the equation of minimal surfaces. (6) is closely related to the analytical functions of complex variable; its theory is well known. The above result is expressed in the Theorem. If a closed contour encloses the sonic transition surface which coincides with the characteristic surface of gas dynamical equations, then this surface will have a minimum area and velocity vector at any point on it, and will be orthogonal to this surface. An example is given as an illustration. There are 1 figure and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: February 13, 1961

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

31631
S/207/61/000/006/006/025
A001/A101

10.1210

AUTHOR: Ryzhov, O.S. (Moscow)

TITLE: Damping of shock waves in steady flows

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1961, 36 - 43

TEXT: The author analyzes basic features of development of small-amplitude shock waves in non-homogeneous steady transsonic flows. He reduces the equation set of gas dynamics to C_+-characteristics and identifies, in the acoustic approximation, a shock wave with the C_+-characteristic surface. It is assumed that the region of the gas disturbed motion is narrow, i.e. its width is considerably smaller than the characteristic radius of shock wave curvature R and distance H at which parameters of the medium in equilibrium state change essentially. The integration of the equation obtained results in Keller's formula (Ref. 5: J. Appl. Phys., 1954, v. 25, no. 8) expressing the law of changing excessive pressure at the front of pressure jump, which holds for both steady and unsteady processes of shock wave propagation. The formula for the width of a disturbed region is also derived in the acoustic approximation. Moreover, the properties of small-ampli-

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

31631
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A001/A101

Damping of shock waves in steady flows

tude waves are considered in the second approximation from the viewpoint of unsteady motions. The author considers the small element of a divergent shock wave with a small width of disturbed region as a plane Riemann wave which is moved in the transverse direction by a uniform stream. Using this concept, the author derives the formulae for the width of disturbed flow region and excessive pressure at the shock wave front. They differ from the corresponding expressions for unsteady waves derived previously by the author (Ref. 9: PMTF, 1961, no. 2). A particular case of plane-parallel flow, having a practical importance, is considered and asymptotic laws of damping of shock waves, applicable to axial-symmetric streams, are derived. The author thanks for discussions Yu.D. Shmyglevskiy, A.I. Golubinskiy, M.D. Ladyzhenskiy and O.Yu. Polayanskiy. The following Soviet personalities are mentioned: L.D. Landau, A.A. Nikol'skiy. There are 13 references: 8 Soviet-bloc and 5 non-Soviet-bloc.

SUBMITTED: September 13, 1961

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

36041

S/040/62/026/002/013/025
D299/D301

24.4300

AUTHOR: Ryzhov, O.S. (Moscow)

TITLE: On the energy of sound waves

PERIODICAL: Prikladnaya matematika i mekhanika, v. 26, no. 2, 1962 316 - 319

TEXT: The propagation of sound waves in a nonhomogeneous medium is considered. It is assumed that, in the undisturbed state, the pressure p_0, density ρ_0, internal energy ε_0 and specific enthalpy w_0 do not change with time; it is also assumed that the amplitude of the waves is small. After simplifications, one obtains the following expression for the law of conservation of energy in sound waves:

$$\frac{\partial}{\partial t}\frac{1}{2}\left(\rho_0 v^2 + \frac{1}{\rho_0 a_0^2} p'^2\right) + \operatorname{div} p'v + \frac{1}{a_0^2}\left(\frac{\partial p}{\partial s_0}\right)_\rho s'vg = 0 \quad (1.3)$$

The propagation of a short sound-wave is considered, i.e. of a wave with a narrow zone of perturbed flow. By introducing the expressions

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for the energy density e and flow q, characterizing a plane wave of small emplitude, in Eq. (1.3), one obtains the basic equation of geometrical acoustics. Integration of the latter yields

$$e = e_o \frac{a_{oo}}{a_o} \exp(- \int_{t_o}^{t} a_o \operatorname{div} n \, dt) \qquad (1.6)$$

where e_o and a_{oo} denote the initial energy-density and equilibrium sound-velocity, respectively. Eq. (1.6) describes the change in sound intensity along the path of the wave element. From Eq. (1.6) one obtains the expression for the amplitude. Further, the propagation of weak sound waves in the geometrical-acoustics approximation is considered. In this approximation, the velocity of the shock differs from that of the sound waves. After transformations, one obtains the following expression for the law of change of the total energy of an elementary sound-pulse

$$\frac{dE}{dt} = - \frac{1}{6} \frac{m_o}{\rho_o^2 a_o^3} f p_*'^3, \qquad (2.3)$$

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where p_*' denotes the amplitude of the shock wave and f - the cross-sectional area of the tube, containing the elementary sound-pulse. The change in E is due to the dissipation of energy in the shock-wave. The magnitude of the dissipation can be calculated, within the framwork of ideal-fluid theory, according to the change of entropy at the shock front. There are 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J.B. Keller, Geometrical Acoustics, 1. The Theory of Weak Shock Waves. J. Appl. Phys., 1954, v. 25, no. 8.

SUBMITTED: December 29, 1961

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, O.S. (Moskva); SHEFTER, G.M. (Moskva)

Energy of sound waves propagating in moving media. Prikl. mat. i mekh. 26 no.5:854-866 S-O '62. (MIRA 15:9)

(Shock waves)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

SHMYGLEVSKIY, Yu.D.; RYZHOV, O.S., otv. red.; ORLOVA, I.A., red.; POPOVA, N.S., tekhn. red.

[Some variational problems in gas dynamics] Nekotorye variatsionnye zadachi gazovoi dinamiki. Moskva, Vychislitel'nyi tsentr AN SSSR, 1963. 141 p. (MIRA 16:6)
(Calculus of variations) (Gas dynamics)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

AID Nr. 986-2 10 June

SHOCK-WAVE FORMATION IN LAVAL NOZZLES (USSR)

Ryzhov, O. S. Prikladnaya matematika i mekhanika, v. 27, no. 2, Mar-Apr 1963, 309-337. S/040/63/027/002/009/019

The calculation of flows in Laval nozzles is associated with difficulties in the plotting of the flow field in the vicinity of the narrowest cross section of the nozzle, where subsonic velocities are converted into supersonic velocities. In previous works by other authors (S. A. Khristianovich, F. I. Frankel', and others) only flows having no shock waves were discussed; in the present work, all types of continuous nonanalytical flows are investigated. It is determined that in noncontinuous flow a shock wave is formed in the center of the nozzle and extends down the flow; this occurs only when infinite accelerations appear in the flow. The shock wave does not interrupt the motion of gas in the nozzle inlet section; the flow behind the shock wave expands, however, more slowly than in continuous flows. If the nozzle throat is 1) upstream from the intersection point of the sound curve with the axis of symmetry or 2) downstream from the nozzle center, but within a certain distance, the flow remains shock-free. An increase in the distance between the throat and the nozzle inlet leads to

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

AID Nr. 986-2 10 June

SHOCK-WAVE FORMATION IN LAVAL NOZZLES [Cont'd] S/040/63/027/002/009/919

the formation of shock waves; therefore, the transition section of the nozzle should not be made too long. The least probability of shock-wave formation is in the transition section of nozzles having broken wall contours. The calculation procedure includes more than eighty equations and is illustrated by thirteen diagrams. Derivation of the principal equations is based on the supposition that entropy is constant in both shocked and shock-free plane-parallel flows. Axially symmetrical flows with local supersonic zones are also investigated. [AD]

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LIFSHITS, YU.B.; RYZHOV, O.S. (Moscow)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

"On the asymptotic type of flow in the vicinity of Laval nozzle centre".

report presented at the "nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5

L 51839-65 EWT(1)/EWP(m)/EWA(d)/FCS(k)/EWA(1) Pd-1

ACCESSION NR: AP5017008 UR/0208/64/004/005/0954/0958

AUTHOR: Lifshits, Yu. B. (Moscow); Ryzhov, O. S. (Moscow)

19
B

TITLE: Certain exact solutions of transonic gas flow equations

SOURCE: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 4, no. 5, 1964, 954-958

TOPIC TAGS: gas flow, transonic aerodynamics

ABSTRACT: In their note the authors reformulate previously known solutions of the equations describing the gas flow in the vicinity of a line passing through the speed of sound. This is followed by a discussion of the repercussion of a slight break in the sonic line. Contrary to the conclusions of A. A. Nikol'skiy and G. I. Taganov (Prikl. matem. i mekhan., 1946, 10, No 4, 481-502), there can exist a simple wave-type gas flow in the region between some point on the sonic line and the break in compression is preceded by the emergence of a boundary line representing the envelope of the family of rectilinear characteristics. The article discusses also certain aspects of other special solutions (trinomial solution, plane-parallel flow). Orig. art. has: 2 figures, 27 formulas.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5

L 51839-65

ACCESSION NR: AP5017008

ASSOCIATION: none

SUBMITTED: 29Dec63 ENCL: 00 SUB CODE: MA, MF

NO REF SOV: 006 OTHER: 003 JPRS

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5

L 14989-65 EWT(1)/EWP(m)/EWA(d)/FCS(k)/EWA(1) Pd-4 AFWL/AEDC(a)/SSD/ASD(a)-5/ ASD(f)-2/ASD(p)-3/AFTC(a)/AFETR/ESD(gs)/ESD(t)

ACCESSION NR: AP5000270 S/0040/64/028/006/0996/1007

AUTHORS: Ryzhov, O. S. (Moscow); Shefter, G. M. (Moscow)

B

TITLE: On the effect of viscosity and thermal conductivity on the structure of compressible flow

SOURCE: Prikladnaya matematika i mekhanika, v. 28, no. 6, 1964, 996-1007

TOPIC TAGS: compressible gas flow, viscous flow, thermal conductivity, unsteady flow, Navier Stokes equation, wave propagation, transonic flow, asymptotic solution, thermodynamic law

ABSTRACT: The study consists of a two-part investigation of dissipative effects on the structure of compressible gas flow. In part (1), using Navier-Stokes equations and the laws of thermodynamics, asymptotic equations are derived satisfying a flow of the "short wave" type propagation in viscous heat-conducting gas. The flow is assumed to be 2-dimensional and unsteady. A moving system of coordinates is introduced, $x = \xi t$, $y = \eta t$, $t = t$, where

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$$\xi = a_0(1 + \Delta_0\delta), \quad \eta = a_0\theta_0\vartheta, \quad t = \mu_0\tau_0\tau / \rho_0 a_0^2$$

$$v_x = a_0 M_0 u, \quad v_y = a_0 N_0 v$$

$$p = \rho_0 a_0^2 (p_0 / \rho_0 a_0^2 + M_0 P), \quad \rho = \rho_0 (1 + M_0 R)$$

$$T = T_0 (1 + M_0 \Omega), \quad a = a_0 (1 + M_0 A)],$$

and Δ_0, M_0, N_0 are small compared to unity. Short waves are characterized by the assumption that the magnitude of velocity and flow gradient in the direction of wave propagation exceed those in the transverse direction, or $N_0 \ll M_0$, $\Delta_0 \ll \theta_0$. This leads to the simplified set of equations

$$R = u, \quad P = u, \quad \Omega = \frac{\gamma_0 - 1}{\alpha_0 T_0} u, \quad \frac{N_0}{\Delta_0}\frac{\partial v}{\partial \delta} = \frac{M_0}{\theta_0}\frac{\partial u}{\partial \vartheta}$$

$$\tau \frac{\partial u}{\partial \tau} + \left[\frac{M_0}{\Delta_0}(u + A) - \delta\right]\frac{\partial u}{\partial \delta} - \vartheta \frac{\partial u}{\partial \vartheta} + \frac{1}{2}\frac{N_0}{M_0\theta_0}\left[\frac{\partial v}{\partial \vartheta} + \frac{(k-1)v}{\vartheta}\right] -$$

$$- \frac{1}{2\tau_0\Delta_0^2\tau}\left[1 + \frac{(\gamma_0 - 1)\varkappa_0}{\mu_0 c_{p_0}}\right]\frac{\partial^2 u}{\partial \delta^2} = 0$$

which are further modified by assuming a perfect gas and

$$\Delta_0 \sim M_0, \quad \frac{N_0\theta_0}{M_0^2} \sim 1, \quad \tau_0 M_0^2 \sim 1, \quad \frac{N_0}{M_0\theta_0} \lesssim 1$$

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lead to

$$\frac{\partial u}{\partial \vartheta} = \frac{\partial v}{\partial \delta}, \quad \tau \frac{\partial u}{\partial \tau} + (m_0 u - \delta)\frac{\partial u}{\partial \delta} - \vartheta \frac{\partial u}{\partial \vartheta} + \frac{1}{2}\left[\frac{\partial v}{\partial \vartheta} + \frac{(k-1)v}{\vartheta}\right] - $$

$$- \frac{1}{2\tau}\left(1 + \frac{\gamma_0 - 1}{N_{\Pr_0}}\right)\frac{\partial^2 u}{\partial \delta^2} = 0 \qquad \left(N_{\Pr} = \frac{\mu c_p}{\varkappa} = \frac{({}^4/_3\lambda + \zeta)\, c_p}{\varkappa}\right).$$

Here, the potential function $\varphi(\delta, \vartheta, \tau)$ is introduced and a new set of equations is obtained which leads to the asymptotic dimensions for the region where the dissipative effects are significant. In part (2) a steady-state transonic flow is discussed. The investigation considers the dissipative effects on the asymptotic flow curves for profiled and body-of-revolution geometries in a sonic flow at infinity. The equations used are analogous to those of part (1), with the exception that the flow parameters are related to critical conditions or

$$x = \frac{\mu_* \Delta_0}{\rho_* a_*} x^\circ, \qquad y = \frac{\mu_* \theta_0}{\rho_* a_*} y^\circ, \qquad t = \frac{\mu_* t_0}{\rho_* a_*^2} t^\circ .$$

The corresponding flow equations take the form

$$\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}, \quad \frac{\partial u}{\partial t} + u\frac{\partial u}{\partial x} - \frac{\partial v}{\partial y} - \frac{(k-1)v}{y} - \frac{\partial^2 u}{\partial x^2} = 0 .$$

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For the steady-state case the potential $\varphi(x,y)$ is given in the form $y^{\frac{3n-2}{\phi}}(x/y^n)$ where n = 4/5 corresponds to a profiled body, and n = 4/7, to a body of revolution. A set of equations is obtained where it is shown that for n = 2/3 the dissipative terms become significant. It is further shown that in the plane case, F. I. Frankl's solution (Issledovaniya po teorii kry*la beskonechnogo razmakha, dvizhushchegosya so skorost'yu zvuka. Dokl. AN SSSR, 1947, t.57, No. 7) describes correctly the transonic flow of ideal gases away from the profiled body. For transonic flow over bodies of revolution, the asymptotic flow pattern in a viscous and heat-conducting gas departs from the ideal flow calculations. "The authors express their deep gratitude to S. A. Kristianovich for his evaluation of this work." Orig. art. has: 40 equations.

ASSOCIATION: none

SUBMITTED: 20Jul64 ENCL: 00

SUB CODE: ME, TD NO REF SOV: 008 OTHER: 010

Card 4/4

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

ACCESSION NR: AP4012078 S/0020/64/154/002/0290/0293

AUTHORS: Lifshits, Yu. B.; Ry*zhov, O. S.

TITLE: Asymptotic type of plane-parallel flow in vicinity of Laval nozzle center

SOURCE: AN SSSR. Doklady*, v. 154, no. 2, 1964,290-293

TOPIC TAGS: gas dynamics, Laval nozzle, plane parallel flow, hydromechanics, hydrodynamics, Cauchy problem, subsonic gas flow, transonic gas flow

ABSTRACT: The following differential equation is derived for describing gas flow in the vicinity of the Laval nozzle center:

$$\frac{d\Psi}{dF} = \frac{-6F - 5n\Psi + 6F^2 + 7F\Psi + \Psi^2}{(n^2 - F)\Psi}.$$

An attempt was then made to construct only those fields of the fluid flow which do not possess singularities in the derivatives of the velocity components along the coordinates on the C^0 characteristic in the center of the nozzle. The streamlines at the points of

ACCESSION NR: AP4012078

intersection with C^o characteristic also do not have any singularities. The gas travel in the intake portion of the nozzle between the axis and the center of the C^o characteristic is expressed by one of the connecting singular points A (0,0) and C(n^2, -n (n+1)) of the integral curves of equation (6) with an initial segment located to the left of the Ψ axis. The point A corresponds to the Ψ axis; the transition through the point C denotes the intersection of the C^o characteristic in the physical plane. The nature of the singularity of the flow on the C^o characteristic is defined by decomposition of the function $\Psi(F)$ in the vicinity of the point C

$$\Psi = -n^2 - n + a_1\Delta F + a_2(\Delta F)^2 + \ldots + b_1(\Delta F)^\lambda + \ldots;$$
$$\Delta F = F - n^2.$$

The coefficients a_i depend only upon n and the arbitrary constant b_1, and the exponent λ of the first term of the irregular part is obtained by

$$\lambda = \frac{5n-7}{n+1}.$$

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

ACCESSION NR: AP4012078

Calculations showed that a solution to equation can be obtained with an exponent of K = 20/11 (n = 11) which will yield an analytic gas flow in the vicinity of the CC characteristic. This flow will be obtained with $A_2 = 0.111\ A_1$ (A_2 and A_1 - arbitrary constants), whereupon the velocity with a shock wave will remain supersonic. Flows with K = 4/3 and 20/11 can be considered as having an asymptotic nature in the vicinity of the nozzle center, but which can be realized with other forms of walls. The peculiarities in them do not originate on the walls, but in the flow itself, at the point of intersection of the sound line with the axis of symmetry and they then shift to the duct's exhaust part. Orig. art. has: 15 equations.

ASSOCIATION: Vy*chislitel'ny*y tseutr Akademii nauk SSSR (Computer center, Academy of Sciences SSSR)

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

S/0020/64/154/005/1052/1055

ACCESSION NR: AP4016500

AUTHOR: Lifshits, Yu. B.; Ry*zhov, O. S.

TITLE: Causes of the formation of shock waves in de Laval nozzles

SOURCE: AN SSSR. Doklady*, v. 154, no. 5, 1964. 1052-1055

TOPIC TAGS: de Laval nozzle, Laval nozzle, supersonic nozzle, shock wave, shock wave formation rocket motor, rocket motor jet

ABSTRACT: The causes leading to the generation of shock waves near the de Laval nozzle throat were analyzed by O.S. Ry* zhov (Prikl. matem. i mekh., 27, no. 2 (1963) 309) on the example of one special solution of a system of equations describing the transonic flow of gas. The present article is devoted to the examination of a more simplified class of solutions of equations for transonic flow

$$-u\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0, \quad \frac{\partial u}{\partial y}=\frac{\partial v}{\partial x}.$$

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In this particular case, x and y are dimensionless cartesian coordinates, and the dimensionless funtions u and v are proportional to the vector component of the induced particle velocity along these axes. A discontinuous solution of equation (1) produces the following cauchy problem. Suppose that, at y = 0, i.e. on the flow's axis of symmetry, we have

$$u = -A_1 |x|^k \text{ when } x < 0; \quad u = A_2 x^k \text{ when } x > 0, \ v = 0$$
$$(A_1 > 0, \ A_2 > 0).$$

It is assumed that the values for the exponent k are contained within the interval 1 k 2. Discontinuous solutions of system (1) describe a flow with a shock wave. Such equations should satisfy, in addition to the initial data of (2), supplementary boundary conditions on the wave front: the equation for the shock polor line

$$2(v_2 - v_1)^2 = (u_2 - u_1)^2 (u_2 + u_1)$$

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and the relation

$$u_2 \frac{dx_2}{dy} + v_2 = u_3 \frac{dx_3}{dy} + v_3,$$

It is easy to show that the unknown solution to the cauchy problem is self-modeling

$$u = y^{2(n-1)} f(\xi), \quad v = y^{3(n-1)} g(\xi), \quad \xi = x/y^n, \quad n = 2/(2-k),$$

wherein the equation for the wave front has the form $\xi = \xi_2 =$ a constant. The initial data of (2) leads to the requirement that the integral curve of

$$\frac{d\Psi}{dF} = \frac{-6F - 5n\Psi + 6F^2 + 7F\Psi + \Psi^2}{(n^2 - F)\Psi},$$

yielding the field of flow near the nozzle throat, would begin and terminate in its singular point A (0,0), which corresponds to the x axis. This curve is defined near A by the expansion

$$\Psi = -\frac{2}{n}F - 2\frac{3n^2 - 7n + 4}{n^3}F^2 + 2\frac{(4n^2 - 7n + 2)(3n^2 - 7n + 4)}{n^5}F^3 + \ldots,$$

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As concerns the boundary conditions (3) and (4), they assume the form

$$F_2 + F_3 = 2n^2, \quad \Psi_2 + \Psi_3 = -2n\,(7n - 5).$$

in the plane $F\Psi$ If

$$0 < \frac{A_2}{A} < \frac{1}{[4 \sin \pi (^3/_8 - j) \sin \pi (^1/_8 + 2j)]^k},$$

then a shock wave originates with supersonic velocity along both sides. The latter inequalities also assure a further increase in velocity and expansion of flow in the region behind the shock wave; but this expansion takes place more slowly than in continuous flows. Orig. art. has: 2 figures and 12 equations.

ASSOCIATION: Vy*chislitel'ny*y tsentr akademii nauk SSSR (Computer Center Academy of Sciences SSSR)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

ACCESSION NR: AP4016500

SUBMITTED: 17Oct63 DATE ACQ: 12Mar64 ENCL: 00

SUB CODE: AI, PR NO REF SOV: 004 OTHER: 004

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

LIFSHITS, Yu.B.; RYZHOV, O.S.

Exceeding the sound velocity in Laval nozzles with circular cross section. Dokl. AN SSSR 158 no.3:562-565 S '64. (MIRA 17:10)

1. Vychislitel'nyy tsentr AN SSSR. Predstavleno akademikom A.A.Dorodnitsynym.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5

L 16397-65 EWT(1)/EWP(m)/EWG(v)/FCS(k)/EWA(1) Pd-1/Pe-5/Pi-4 AEDC(a)/AEDC(b)/SSD/SSD(b)/BSD/AFWL/ASD(f)-2/ASD(p)-3/AFETR

ACCESSION NR: AP4046369 S/0020/64/158/003/0562/0565

AUTHOR: Lifshits, Yu. B.; Ry*zhov, O. S.

B

TITLE: Transition through the sonic velocity in Laval nozzles with circular cross section

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 562-565

TOPIC TAGS: Laval nozzle, transonic velocity, shock wave, nozzle design, supersonic nozzle

ABSTRACT: Von Karman equations describing axisymmetrical transonic flow are used for the analysis of the flow in circular supersonic nozzles. It is demonstrated that the flow has an asymptotic character in the center of the nozzle. Its special features originate in the flow itself and not on the nozzles' walls. Two types of asymptotic flow are shown with different velocity fields. In the case of discontinuous flow, the shock wave originates in the center of the nozzle and then drifts down the flow. It is concluded that the formation of shock waves in the vicinity of the throat of the nozzle is due to a long transition zone. An increased distance between the throat and the inlet results in a slower expansion of gases

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

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ACCESSION NR: AP4046369

and consequently in the formation of flow discontinuities. In a limiting case the velocity behind the shock wave is equal to the critical velocity along the axis of symmetry of the nozzle. Orig. art. has: 11 formulas and 4 figures.

ASSOCIATION: Vychislitel'nyy tsentr Akademii nauk SSSR (Computing Center, AN SSSR)

SUBMITTED: 13Apr64 ENCL: 00 SUB CODE: PR, ME

NO REF SOV: 005 OTHER: 003

ACC NR: AM6016005 Monograph UR

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

Ryzhov, O. S.

Study of transonic flows in Laval nozzles (Issledovaniye transzvukovykh techeniy v soplakh Lavalya) Moscow, VTs AN SSSR, 1965. 236 p. illus., biblio. Errata printed inside of back cover. 1560 copies printed.

Series note: Akademiya nauk SSSR. Trudy Vychislitel'nogo tsentra

TOPIC TAGS: transonic flow, Laval nozzle, nozzle flow

PURPOSE AND COVERAGE: Investigations of transonic flows in Laval nozzles conducted in the Soviet Union and abroad are described. Special attention is given to quantitative flow characteristics. The qualitative methods of construction of velocity fields, pressures, and other gas parameters are barely touched upon. Therefore, almost all data is based on approximate systems of equations, which can be used as long as the velocity of particles differs only slightly from the speed of sound. The book is intended for scientific personnel dealing with problems of transonic flows.

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ACC NR: AM6016005 APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

SUB CODE: 20/ SUBM DATE: 19Apr65 / ORIG REF: 088/ OTH REF: 076/

L 27356-66 EWT(1)/EWP(m)/EWT(d)/EWA(d)/FCS(k)/EWA(1) IJP(c)

ACC NR: AP6000539 SOURCE CODE: UR/0040/65/029/006/1004/1014

AUTHOR: Ryzhov, O. S. (Moscow)

ORG: none

TITLE: Asymptotic pattern of transonic, viscous, heat-conducting gas flow over bodies of revolution

SOURCE: Prikladnaya matematika i mekhanika, v. 29, no. 6, 1965, 1004-1014

TOPIC TAGS: aerodynamics, viscous flow, transonic flow, flow analysis, flow field, compression shock wave, asymptotic solution

ABSTRACT: The Navier-Stokes equations are analyzed in detail under the assumption that the velocity of gas particles in the entire region of flow is transonic. A substantially simpler linear equation than the nonlinear Liepmann-Ashkenas-Cole equation is derived which is quite correct when the flow field is determined by viscosity and heat conductivity. This equation is applied to the study of asymptotic laws of decay of disturbances at large distances from a symmetrical body of revolution in a gas flow at Mach number one at infinity. It was established that: 1) the width of the ℓ zone in which the values of flow parameters deviate substantially from those corresponding to free-stream flow is proportional to $r^{2/3}$, where r is the distance from the axis of symmetry; 2) the difference between the local Mach number and unity is inversely proportional to $r^{4/3}$; and 3) the angle between

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ACC NR: AP6000539 0

the velocity vector and the direction of undisturbed flow is inversely proportional to $r^{5/3}$. It follows from a comparison with the solutions of a similar problem obtained by Guderley-Yoshihara-Barish and by Fal'kovich-Chernyy for an ideal gas flow, that the influence of dissipative factors leads to disappearance of the compression wave and rapid decay of disturbances downstream. The problem of a half-body extending to infinity in transonic gas flow is also considered. Orig. art. has: 2 figures and 36 formulas. [AB]

SUB CODE: 20/ SUBM DATE: 21May65/ ORIG REF: 006/ OTH REF: 011/ ATD PRESS: 4154

jw

Card 2/2

L 22990-66 EWT(1)/EPF(n)-2/ETC(F)/EWG(m) IJP(c) WW/GW

ACC NR: AP6012548 SOURCE CODE: UR/0040/66/030/002/0296/0302

AUTHOR: Ryzhov, O. S. (Moscow)

ORG: none

TITLE: The effect of viscosity and heat conductivity on the propagation of sound waves

SOURCE: Prikladnaya matematika i mekhanika, v. 30, no. 2, 1966, 296-302

TOPIC TAGS: sound wave, viscosity, heat conductivity, shock wave propagation, cylindric shock wave, spheric shock wave, shock wave decay acoustics, fluid mechanics

ABSTRACT: The attenuation of disturbances in cylindrical and spherical sound waves is investigated, with viscosity and heat conductivity effects taken into account. A system of equations formed by the continuity, Navier-Stokes, and heat conduction equations, and two differential relations for specific entropy and temperature is analyzed, assuming that the value of all gas parameters in the region considered differ little from their corresponding values at equilibrium. The gas flow is assumed to be a short wave, that is, the width of the region where disturbances exist is small compared to the distances along which

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

ACC NR: AP6012548

the wave propagates. On the basis of the analysis presented here, two specific cases are considered: the propagation of shock waves in ideal media and the asymptotic attenuation of sound waves. It is shown that the wave structure and the asymptotic laws of their attenuation when $t \to \infty$ are closely associated with the effects of viscosity and heat conductivity. The variation of all gas parameters is very smooth inside the waves, though the propagation of shock waves, as long as their width is much smaller than the general wave length, is determined by the nonlinear convective terms of the gas dynamic equations. The variation of the maximum overpressure in N-waves when $t \to \infty$, with viscosity and heat conductivity effects taken into account, is inversely proportional to $t^{3/2}$ for motion with axial symmetry and to t^2 for spherically symmetric motion. The author does not agree with Lighthill's assertion that the asymptotic laws of attenuation are exponential since the overpressure varies exponentially only in periodic sound vibrations with a fixed wavelength. Orig. art. has: 15 formulas. [AB]

SUB CODE: 20/ SUBM DATE: 07Dec65/ ORIG REF: 006/ OTH REF: 005
ATD PRESS: 4238

Card 2/2

L 43100-66 EWT(1)/EWP(m)/EWT(m)/EWP(w)/EWA(d)/T/ETC(m)-6/EWP(k) IJP(c) WW/EM

ACC NR: AP6011358 SOURCE CODE: UR/0208/66/006/002/0276/0287

AUTHOR: Lifshits, Yu. B. (Moscow); Ryzhov, O. S. (Moscow)

ORG: none

TITLE: On the variation in gas dispersion in the designed working cycle of a Laval nozzle

SOURCE: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 6, no. 2, 1966, 276-287

TOPIC TAGS: Laval nozzle, gas flow, gasdynamics

ABSTRACT: Gas flow through a Laval nozzle is studied from the standpoint that the formulation of the problem may be simplified because the change in gas dispersion is continuous. At the same time, mathematical simplifications arising from the assumption that small changes in nozzle form are insignificant are avoided, it being assumed that the projection of the contour of the nozzle on the plane of the hodograph is not given, but that its determination must proceed from the process of solution of the boundary value problem itself. The direct problem of the theory of the nozzle thus has two aspects. The first reduces to the question of whether in a unit of time various quantities of gas may be released through nozzle channels of a given form without changing the qualitative properties of the flow. On the other hand, one must assume

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that the gas dispersion takes on discrete values which differ by finite quantities, thus necessitating qualitative changes with changes in flow. It is shown that the first assumption holds if the asymptotic type of flow changes in the region near the center of the nozzle; but, if it does not change, then changes in gas flow are strictly limited. Various types of asymptotic gas movement are studied to support this hypothesis. Orig. art. has: 61 formulas, 3 figures.

SUB CODE: 20,12/ SUBM DATE: 26Jul65/ ORIG REF: 007/ OTH REF: 001

Card 2/2 MLP

RYZHOV, P.

Iz Istorii Razvitiia Gornogeometricheskikh Rabot (From the History of Development of Geometrical Operations in Mining) (Paper edition)

SO: Four Continent Book List, April 1954

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RYZHOV, P.

Proektzii Primeniaemye v Geologo-Marksheiderskom Dele (Projects in Mine Surveying) (Paper edition)

167 p. 85¢

SO: Four Continent Book List, April 1954

RYZHOV, P. APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

42501: RYZHOV, P. A. - K voprosu o metodike detal'noy razvedkn shakhtnykh poley podmoskovnogo basseyna. (S grimech. red.) Trudy Geol.-issled. byuro (M-vo ugol'noy prom-sti Zap. r-nov SSSR. Geol.-razvedoch. ugr), VYP 4, 1948, s. 27-43- Bibliogr: 7 nazv.

SO: Letopis' Zhurnal'nykh Statey, Vol. 47, 1948.

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RYZHOV, P. A.

From the history of the development of mine surveying. Moskva, Ugletekhizdat, 1950. 58p. (55-21419)

1. Mine surveying. 2. Mining engineering - Hist.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, P. A.

RYZHOV, P. A. Projections used in geology and mine surveying. Moskva, Ugletekhizdat, 1951. 167 p. (51-35456)

MH

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, P.A., professor, doktor tekhnicheskikh nauk.

[Geometry of mineral resources] Geometriia nedr. Moskva, Ugletekhizdat, 1952. 604 p. (MLRA 6:7)

(Mines and mineral resources)

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RYZHOV, P.A.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Ryzhov, P.A.	"Geometry of Mineral Resources"	Moscow Mining Institute imeni I.V. Stalin

SO: W-30604, 7 July 1954

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

BUKRINSKIY, V.A.; SLAVOROSOV, A.Kh.; RYZHOV, P.A., redaktor.

[P.K.Sobolevskii, founder of the science of mine geometry] Osnovopolozhnik geometrii nedr P.K.Sobolevskii. Pod red. P.A.Ryzhova. Moskva, Ugletekhizdat, 1954. 115 p. (MLRA 7:11D)

RYZHOV, F. A.

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"Evaluating the Accuracy of Computation of the Reserves of Useful Minerals in Deposits".

Issled. po vopr. marksheyd dela, No 28, pp 48-71, 1954.

The article possesses a discursive character and is published by the editors on the order of a discussion. The editors have pointed to a number of untrue philosophical amd mathematical statements made in the article. The author disputes with Prof. D. A. Kazakovskiy ("Problem of Evaluating Errors of Analogy in the Computation of Reserves of Deposits," ibid., No 24, 1951), who in his works arrived at a conclusion concerning the inapplicability in principle of the laws and methods of mathematical statistics and theory of probability for the computation of the reserves of mineral resources on the gasis of ordinary data of a survey. The author attempts to demonstrate that the accuracy of computation of reserves according to formulas of mathematical statistics in satisfactory. (RZhGeol, No, 9, 1955)

SO: Sum No 812, 6 Feb 1956

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RYZHOV, P.A., professor; RASHKOVSKIY, Ya.Z., gornyy inzhener.

Remarks on N.S. Petrov's textbook "Mine surveying." Ugol' 29 no.9:43-46 S '54. (MLRA 7:11)
(Mine surveying) (Petrov, N.S.)

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Ryz

MALAKHOV, G.M.; LUGAVSKOY, S.I.; MARTYNOV, V.K.; NIKULIN, S.E., GUMINSKIY, M.V. RYZHOY, P.A., redaktor; PARTSEVSKIY, redaktor; MIKHAYLOVA, tekhnicheskiy redaktor.

[Reducing waste and loss of iron ore in the working of mines in Krivoy Rog Basin] Snizhenie poter'i razuboshivaniia zheleznoi rudy pri razrabotke mestorozhdenii Krivorozhskogo basseina. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1955. 208 p.
(Krivoy Rog--Iron mines and mining) (MLRA 9:4)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

ANDREYEV, A.B.; ANTONOV, A.I.; ARAPOV, P.P., BARMASH, A.I., BEDNYAKOVA, A.B.; BENIN, G.S.; BERESNEVICH, V.V.; BERNSHTEYN, S.A.; BITYUTSKOV, V.I.; BLYUMENBERG, V.V.; BONCH-BRUYEVICH, M.D.; BORMOTOV, A.D.; BULGAKOV, N.I.; VEKSLER, B.A.; GAVRILENKO, I.V.; GENDLER, Ye.S., [deceased]; GERLIVANOV, N.A., [deceased]; GIBSHMAN, Ye.Ye.; GOLDOVSKIY, Ye.M.; GORBUNOV, P.P.; GORYAINOV, F.A.; GRINBERG, B.G.; GRYUNER, V.S.; DANOVSKIY, N.F.; DZEVUL'SKIY, V.M., [deceased]; DREMAYLO, P.G.; DYBETS, S.G.; D'YACHENKO, P.F.; DYURNBAUM, N.S., [deceased]; YEGORCHENKO, B.F. [deceased]; YEL'YASHKEVICH, S.A.; ZHEREBOV, L.P.; ZAVEL'SKIY, A.S.: ZAVEL'SKIY, F.S.; IVANOVSKIY, S.R.; ITKIN, I.M.; KAZHDAN, A.Ya.; KAZHINSKIY, B.B.; KAPLINSKIY, S.V.: KASATKIN, F.S.; KATSAUROV, I.N.; KITAYGORODSKIY, I.I.; KOLESNIKOV, I.F.; KOLOSOV, V.A.; KOMAROV, N.S.; KOTOV, B.I.; LINDE, V.V.; LEBEDEV, H.V.; LEVITSKIY, N.I.; LOKSHIN, Ya.Yu; LUTTSAU, V.K.; MANNERBERGER, A.A.; MIKHAYLOV, V.A.; MIKHAYLOV, N.M.; MURAV'YEV, I.M.; NYDEL'MAN, G.E.; PAVLYSHKOV, L.S.; POLUYANOV, V.A.; POLYAKOV, Ye.S.; POPOV, V.V.; POPOV, N.I.; RAKHLIN, I.Ye., RZHEVSKIY, V.V.; ROZENBERG, G.V.; ROZENTRETER, B.A.; ROKOTYAN, Ye.S.; RUKAVISHNIKOV, V.I.; RUTOVSKIY, B.N. [deceased]; RYVKIN, P.M.; SMIRNOV, A.P.; STEPANOV, G.Yu, STEPANOV, Yu.A.; TARASOV, L.Ya.; TOKAREV, L.I.; USPASSKIY, P.P.; FEDOROV, A.V.; FERE, N.E.; FRENKEL', N.Z.; KHEYFETS, S.Ya.; KHLOPIN, M.I.; KHODOT, V.V.; SHAMSHUR, V.I.; SHAPIRO, A.Ye.; SHATSOV, N.I.; SHISHKINA, N.N.; SHOR, E.R.; SHPICHENETSKIY, Ye.S.; SHPRINK, B.E.; SHTERLING, S.Z.; SHUTYY, L.R.; SHUKHGAL'TER, L. Ya.; ERVAYS, A.V.;

(Continued on next card)

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ANDREYEV, A.B. (continued) .... Card 2.

YAKOVLEV, A.V.; ANDREYEV, Ye.S., retsenzent, redaktor; BERKEN-GEYM, B.M., retsenzent, redaktor; BERMAN, L.D., retsenzent, redaktor; BOLTINSKIY, V.N., retsenzent, redaktor; BONCH-BRUYEVICH, V.L., retsenzent, redaktor; VELLER, M.A., retsenzent, redaktor; VINOGRADOV, A.V., retsenzent, redaktor; GUDTSOV, N.T., retsenzent, redaktor; DEGTYAREV, I.L., retsenzent, redaktor; DEM'YANYUK, F.S., retsenzent; redaktor; DOBROSMYSLOV, I.N., retsenzent, redaktor; YELANCHIK, G.M. retsenzent, redaktor; ZHEMOCHKIN, D.N., retsenzent, redaktor; SHURAVCHENKO, A.N., retsenzent, redaktor; ZLODEYEV, G.A., retsenzent, redaktor; KAPLUNOV, R.P., retsenzent, redaktor; KUSAKOV, M.M., retsenzent, redaktor; LEVINSON, L.Ye., [deceased] retsenzent, redaktor; MALOV, N.N., retsenzent, redaktor; MARKUS, V.A. retsenzent, redaktor; METELITSYN, I.I., retsenzent, redaktor; MIKHAYLOV, S.M., retsenzent; redaktor; OLIVETSKIY, B.A., retsenzent, redaktor; PAVLOV, B.A., retsenzent, redaktor; PANYUKOV, N.P., retsenzent, redaktor; PLAKSIN, I.N., retsenzent, redaktor; RAKOV, K.A. retsenzent, redaktor; RZHAVINSKIY, V.V., retsenzent, redaktor; RINBERG, A.M., retsenzent; redaktor; ROGOVIN, N. Ye., retsenzent, redaktor; RUDENKO, K.G., retsenzent, redaktor; RUTOVSKIY, B.N., [deceased] retsenzent, redaktor; RYZHOV, P.A., retsenzent, redaktor; SANDOMIRSKIY, V.B., retsenzent, redaktor; SKRAMTAYEV, B.G., retsenzent, redaktor; SOKOV, V.S., retsenzent, redaktor; SOKOLOV, N.S., retsenzent, redaktor; SPIVAKOVSKIY, A.O., retsenzent, redaktor; STRAMENTOV, A.Ye., retsenzent, redaktor; STRELETSKIY, N.S., retsenzent, redaktor;

(Continued on next card)

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ANDREYEV, A.V., (contimued) .... Card 3.

TRET'YAKOV, A.P., retsenzent, redaktor; FAYERMAN, Ye.M., retsenzent, redaktor; KHACHATYROV, T.S., retsenzent, redaktor; CHERNOV, H.V., retsenzent, redaktor; SHERGIN, A.P., retsenzent, redaktor; SHESTOPAL, V.M., retsenzent, redaktor; SHESHKO, Ye.F., retsenzent, redaktor; SHCHAPOV, N.M., retsenzent, redaktor; YAKOBSON, M.O., retsenzent, redaktor; STEPANOV, Yu.A., Professor, redaktor; DEM'YANYUK, F.S., professor, redaktor; ZNAMENSKIY, A.A., inzhener, redaktor; PLAKSIN, I.N., redaktor; RUTOVSKIY, B.N. [deceased] doktor khimicheskikh nauk, professor, redaktor; SHUKHGAL'TER, L. Ya, kandidat tekhnicheskikh nauk, dotsent, redaktor; BRESTINA, B.S., redaktor; ZNAMENSKIY, A.A., redaktor.

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ANDREYEV, A.V. (continued) .... Card 4.

[Concise polytechnical dictionary] Kratkii politekhnicheskii slovar'. Redaktsionnyi sovet; IU,A.Stepanov i dr. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1955. 1136 p. (MLRA 8:12)

1. Chlen-korrespondent AN SSSR (for Plaksin)
(Technology--Dictionaries)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

GEL'MAN, David Zakharovich; PROSHIN, Firs Yefimovich; LAVRINENKO, Vladimir Filippovich; RYZHOV, P.A., prof., doktor tekhn.nauk; retsenzent; LISHUTIN, B.G., gornyy inzh., retsenzent, red.; SHUSTOVA, V.M., red.izd-va; KARASEV, A.I., tekhn.red.

[Surveying operations in stoping] Marksheiderskie raboty pri ochistnoi vyemke rudy. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1959. 231 p. (MIRA 12:5)

(Stoping (Mining) (Mine surveying)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

OGLOBLIN, Dmitriy Nikolayevich. Prinimal uchastiye: REYZENKIND, I.Ya. RYZHOV, P.A., prof., doktor tekhn.nauk, retsenzent; PARTSEVSKIY, V.N., red.izd-va; BEKKER, O.G., tekhn.red.

[Surveying in underground mining] Marksheiderskie raboty pri podzemnoi razrabotke mestorozhdenii. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii. Pt.1. [Underground surveying] Podzemnye marksheiderskie s"emki. 1959. 477 p. (MIRA 12:5)

(Mine surveying)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, P.A., prof.; BORSHCH-KOMPANEYETS, V.I., kand.tekhn.nauk; MARTYNOV, Yu.I.

Predicting the fractured state of ore bodies in Dzhezkazgan. Izv.vys.ucheb.zav.; gor.zhur. 7 no.12:21-24 '64. (MIRA 18:2)

1. Moskovskiy institut radioelektroniki i gornoy elektromekhaniki. Rekomendovana kafedroy marksheyderskogo dela.

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, P. A., prof.; GUDKOV, V. M., dotsent

Some features of the distribution of metals in ore deposits. Izv. vys. ucheb. zav.; gor. zhur. no.10:74-77 '61. (MIRA 15:10)

1. Moskovskiy gornyy institut imeni I. V. Stalina. Rekomendovana kafedroy marksheyderskogo dela.

(Ore deposits)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, P.A., prof.; SONIN, S.D., prof.

"Mining of the Pechora Basin coal deposits" by I.V.Zaitsev and others. Reviewed by P.A.Ryzhov, S.D.Sonin. Ugol' Ukr. 5 no.4: 45 Ap '61. (MIRA 14:4)

(Pechora Basin--Coal mines and mining)
(Zaitsev, I.V.)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

YEGOROV, P., student V kursa; RYZHOV, P.A., prof., doktor tekhn.nauk

Establishing a relationship between the angles of displacement and the occurrence of fissures. Nauch. rab. stud. GNSO MGI no.7:108-117 1959. (MIRA 14:5)
(Leninogorsk region (Altai Mountains)--Mining geology)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, Petr Aleksandrovich; BUKRINSKIY, Viktor Aleksandrovich; TROFIMOV, A.A., otv.red.; SLAVOROSOV, A. Kh., red.izd-va; LOMILINA, L.N., tekhn.red.; KOROVENKOVA, Z.A., tekhn.red.

[Mining geometry] Gornaia geometriia. Ugletekhizdat, 1958. 322 p. (MIRA 12:1)
(Mine surveying)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, Petr Aleksandrovich. Prinimali uchastiye: BUKRINSKIY, V.A., kand. tekhn.nauk, dots.; GUDKOV, V.M., kand.tekhn.nauk, dots.; RUDAKOV, M.L., doktor tekhn.nauk, prof.; SHEYKO, V.G., inzh.; BYSTRIGIN, N.M., inzh.; TROFIMOV, A.A., prof., retsenzent; OGLOBLIN, D.N., prof., retsenzent; SLAVOROSOV, A.Kh., red.izd-va; BOLDYREVA, Z.A., tekhn. red.; EPPEL', N.Ya., tekhn. red.; SHITOVA, A.S., tekhn. red.

[Geometry of mineral deposits] Geometriia nedr. Izd.3., pe-rer. i dop. Moskva, Izd-vo "Nedra," 1964. 500 p. (MIRA 17:3)

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RYZHOV, Petr Aleksandrovich, prof., doktor tekhn.nauk; BUKRINSKIY, Viktor Aleksandrovich, dotsent, kand.tekhn.nauk; GUDKOV, Valentin Mikhaylovich, kand.tekhn.nauk; KROTOV, Gavriil Alekseyevich, dotsent, kand.tekhn.nauk; LYUBMAN, Izrail' Borisovich, assistent; RUDAKOV, Mikhail Lazarevich, prof., doktor; PIKULIN, A.P., kand. tekhn.nauk, retsenzent; BUTKEVICH, T.V., red.; PARTSEVSKIY, V.N., red.izd-va; BEKKER, O.G., tekhn.red.

[Mine surveying] Marksheiderskoe delo. Pod nauchnoi red. P.A. Ryzhova. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1958. 463 p. (MIRA 12:1)

(Mine surveying)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

AVERSHIN, S.G., prof., doktor tekhn. nauk, red.; BLOKHA, Ye. Ye., gornyy inzh., red.; BUTKEVICH, T.V., gornyy inzh., red.; KRIKUNOV, L.A., gornyy inzh., red.; LISHUTIN, B.G., gornyy inzh., red.; OGLOBLIN, D.N., prof., doktor tekhn. nauk,, red.; OMEL'CHENKO, A.N., kand. tekhn. nauk, red.; RYZHOV, P.A., prof., doktor tekhn. nauk,; GLAZENAP, K.K., inzh., red.; KONSTANTINOVA, L.F., inzh., red.; NIKITINA, M.M., inzh., red.; NOVOSELOVA, Yu. A., inzh., red.; SHUL'GO, Ye. I., inzh., red.; YAKOVLEV, M.G., inzh., red.; RASHKOVSKIY, Ya.Z., inzh., red.; STEL'MAKH, A.N., red. izd-va,; BERLOV, A.P., tekhn. red.; NADEINSKAYA, A.A., tekhn. red.

[Transactions of the All-Union Scientific and Technical Conference on Mine Surveying July 17-23, 1956] Trudy vsesoiuznogo nauchno-tekhnicheskogo soveshchania po marksheiderskomu delu 17-23 iulia 1956 g. Moskva, Ugletekhizdat, 1958. 743 p. (MIRA 11:12)

1. Vsesoyuznoye nauchno-tekhnicheskoye soveshchaniye po marksheyderskomu delu. 1956.
(Mine surveying)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

ABRAMOV, S.K., kand.tekhn.nauk; AVERSHIN, S.G., prof., doktor tekhn.nauk; AMMOSOV, I.I., doktor geol.-min.nauk; ANDRIYEVSKIY, V.D., inzh.; ANTROPOV, A.N., inzh.; AFANAS'YEV, B.L., inzh.; BERGMAN, Ya.V., inzh.; BLOKHA, Ye.Ye., inzh.; BOGACHEVA, Ye.N., inzh.; BUKRINSKIY,V.A., kand.tekhn.nauk; VASIL'YEV, P.V., doktor geol.-min.nauk; VINOGRADOV, B.G., inzh.; GOLUBEV, S.A., inzh.; GORDIYENKO, P.D., inzh.; GUSEV, N.A., kand.tekhn.nauk; DOROKHIN, I.V., kand.geol.-min.nauk; KALMYKOV, G.S., inzh.; KASATOCHKIN, V.I., doktor khim.nauk; KOROLEV, I.V., inzh.; KOSTLIVTSEV, A.A., inzh.; KRATKOVSKIY, L.F., inzh.; KRASHENINNIKOV, G.F., prof. doktor geol.-min.nauk; KRIKUNOV, L.A., inzh.; LEVIT, D.Ye., inzh.; LISITSA, I.G., kand.tekhn.nauk; LUSHNIKOV, V.A., inzh.; MATVEYEV, A.K., dots., kand.geol.-min.nauk; MEPURISHVILI, G.Ye., iznh.; MIRONOV, K.V., inzh.; MOLCHANOV, I.I., iznh.; NAUMOVA, S.N., starshiy nauchnyy sotrudnik; NEKIPELOV, V.Ye., inzh.; PAVLOV, F.F., doktor tekhn.nauk; PANYUKOV, P.N., doktor geol.-min.nauk; POPOV, V.S., inzh.; PYATLIN, M.P., kand.tekhn. nauk; RASHKOVSKIY, Ya.E., inzh.; ROMANOV, V.A., prof., doktor tekhn. nauk; RYZHOV, P.A., prof., doktor tekhn.nauk; SELYATITSKIY, G.A., inzh.; SPERANSKIY, M.A., inzh.; TERENT'YEV, Ye.V., inzh.; TITOV, N.G.,doktor khim.nauk; GOKAREV, I.F., inzh.; TROYANSKIY, S.V., prof.; doktor geol.-min.nauk; FEDOROV, B.D., dots., kand.tekhn.nauk;FEDOROV, V.S., inzh. [deceased]; KHOMENTOVSKIY, A.S., prof., doktor geol.-min.nauk; TROYANOV-SKIY, S.V., otvetstvennyy red.; TERPIGOREV, A.M., red.; KRIKUNOV, L.A., red.; KUZNETSOV, I.A., red.; MIRONOV, K.V., red.; AVERSHIN, S.G., red.; BURTSEV, M.P., red.; VASIL'YEV, P.V., red.; MOLCHANOV, I.I., red.; RYZHOV, P.A., red.; BALANDIN, V.V., inzh., red.; BLOKH, I.M., kand. tekhn.nauk, red.; BUKRINSKIY, V.A., kand.tekhn.nauk; red.; VOLKOV, K.Yu., inzh., red.; VOROB'YEV, A.A., inzh., red.; ZVONAREV, K.A., prof. doktor tekhn.nauk, red.

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ABRAMOV, S.K.--- (continued) Card 2.

ZDANOVICH, V.G., prof.,doktor tekhn.nauk,red.; IVANOV, G.A., doktor geol.-min.nauk, red.; KARAVAYEV, N.M., red.; KOROTKOV, G.V., kand.geol.-min.nauk, red.; KOROTKOV, M.V., kand.tekhn.nauk, red.; MAKKAVEYEV, A.A., doktor geol.-min.nauk, red.; OMEL'CHENKO, A.N.,kand.tekhn.nauk,red.; SENDERZON, E.M.,kand.geol.-min.nauk, red.; USHAKOV, I.N., dots., kand. tekhn.nauk, red.; YABLOKOV, V.S., kand.geol.-min.nauk,red.; KOROLEVA, T.I., red.izd-va; KASHALKINA, Z.I., red.izd-va; PROZOROVSKAYA, F.L., tekhn.red.; NADEINSKAYA, A.A., tekhn.red.

[Mining; an encyclopedia handbook] Gornoe delo; entsiklopedicheskii spravochnik. Glav. red. A.M.Terpigorev. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po ugol'noi promyshl. Vol.2. [Geology of coal deposits and surveying] Geologiia ugol'nykh mestorozhdenii i marksheiderskoe delo. Redkolegiia toma S.V.Troianskiy. 1957. 646 p. (MIRA 11:5)

1. Chlen-korrespondent AN SSSR (for Karavayev)
(Coal geology--Dictionaries)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RYZHOV, P.A., prof., doktor tekhn. nauk.

Use of mathematical statistics in evaluating the accuracy of estimates of ore deposit reserves. [Trudy] VNIMI no.31:131-138 '57. (MIRA 11:1)
(Ores--Sampling and estimation)
(Mathematical statistics)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

RINKEVICH, A.A., professor, doktor tekhnicheskikh nauk, zasluzhenyy deyatel' nauki i tekhniki; IVANOV, V.I., professor, doktor tekhnicheskikh nauk; FREMKE, A.V., doktor tekhnicheskikh nauk; RAZUMOVSKIY, N.N., doktor tekhnicheskikh nauk; DMITRIYEV, A.N., dotsent, kandidat tekhnicheskikh nauk; NORNEVSKIY, B.I., dotsent, kandidat tekhnicheskikh nauk; BASHARIN, A.V., dotsent, kandidat tekhnicheskikh nauk; MANOYLOV, V.Ye., dotsent, kandidat tekhnicheskikh nauk; RYZHOV, P.I., dotsent, kandidat tekhnicheskikh nauk; KEPPERMAN, A.G., kandidat tekhnicheskikh nauk; BARYSHNIKOV, V.D., kandidat tekhnicheskikh nauk

On the article "Development of automatic control and telemechanics in the fifth five-year plan". Avtom. i telem. 15 no.1:78-79 Ja-F '54. (MLRA 10:3)

1. Leningradskiy elektrotekhnicheskiy institut im. V.I.Ul'yanova-Lenina.

(Automatic control) (Remote control)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

USSR/Electricity - Transmission Lines - Modeling FD-2997

Card 1/1 Pub. 41 - 10/12

Author : Ivanov, V. I., Ryzhov, P. I., and Sirotko, V. K., Leningrad
[redacted]

Title : Device for modeling the operating condition of a two circuit [three phase] line during disruption of one phase

Periodical : Izv. AN SSSR. Otd. Tekh. Nauk, 3, 150-153, March 1955

Abstract : Describes the employment of a model in the study of the double circuit transmission line from the Kuybyshev electro-power station to Moscow. The double circuit line carries three phase current and the experimentation described in this article deals with the use of two phases of the three phase system in case of emergency breakdown of one of these phases. Concludes that with the line current of from 0-5 times the normal all the resistances remain accurate from 1 to 1.5%; when the current is 5 times the normal, the voltage of the reaction coil does not show any distortion, and the current remains sinusoidal; the model completely duplicates the actual operation and thus modeling should lend itself to other forms of experimentation. Pictures, diagrams.

Institution : Leningrad Branch of the Institute of Automatics and Telemechanics, Academy of Sciences, USSR

Submitted : November 20, 1954

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

IVANOV, V.I.; RYZHOV, P.I.; SIROTKO, V.K.

Investigation of relay protection by means of an electrodynamic model of power systems of the IEM of the Academy of Sciences of the U.S.S.R. Nauch.dokl.vys.shkoly; energ. no.3:187-192 '58.
(MIRA 12:1)

1. Institut elektromekhaniki AN SSSR.
(Power engineering--Models)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R001446530003-5"

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S/105/60/000/07/26/027
B007/B005

AUTHORS: Bogoroditskiy, N. P., Syromyatnikov, I. A., Fedoseyev, A. M., Atabekov, G. I., Yermolin, N. P., Ryzhov, P. I., Timofeyev, V. A., and Others

TITLE: Professor V. I. Ivanov (On His 60th Birthday)

PERIODICAL: Elektrichestvo, 1960, No. 7, pp. 94-95

TEXT: This is a short biography of Viktor Ivanovich Ivanov born in April 1900 at Penza as the son of an engine driver. He is Doctor of Technical Sciences and Professor at the Leningradskiy elektrotekhnicheskiy institut im. Ul'yanova (Lenina)(Leningrad Electrotechnical Institute imeni Ul'yanov (Lenin)). He finished his secondary school education in 1918, and enrolled at the fiziko-matematicheskiy fakul'tet Saratovskogo universiteta (Department of Physics and Mathematics at Saratov University), and in 1921 at the Leningrad Electrotechnical Institute imeni Ul'yanov (Lenin) from which he graduated in the special subject of electric power plants in 1927. He started his pedagogical activity at the same institute under the

supervision of A. A. Smurov in the same year, and conducted - at the same time - the investigations of protective relays at the Leningradskaya energosistema (Leningrad Power Network). Under the supervision of R. A. Lyuter and together with P. I. Ryzhov, he established a laboratory for protective relays at the same institute, and was among the first in the USSR to give lectures on protective relays and short-circuit currents. At the same time, he organized - at Lenenergo together with P. I. Ryzhov - the first service for protective relays in the USSR. His book on this field was published in 1932. From 1932 to 1941, he conducted the department of protective relays at the laboratory of A. A. Smurov. He developed a carrier-current protection for transmission lines, and under his supervision the laboratoriya im. Smurova (Laboratory imeni Smurov) installed 40 such sets at the Mosenergo, Lenenergo, Donbassenergo, and Uralenergo. During the first war years, he worked in the Ural, and besides, lectured at the Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute) and the Lesotekhnicheskiy institut (Forest Technology Institute). In 1944-47 he lectured at the Akademiya im. Zhukovskogo (Academy imeni Zhukovskiy) and the Moskovskiy aviatsionnyy institut im. Ordzhonikidze (Moscow Aviation Institute imeni Ordzhonikidze).

In 1947 he returned to the Leningrad Electrotechnical Institute, and conducted the kafedra tekhniki vysokikh napryazheniy (Chair of High Voltage) which he transformed to the kafedra moshchnykh vysokovol'tnykh preobrazovatel'nykh ustroystv promyshlennykh i impul'snykh ustanovok (Chair of Large High-voltage Rectifying Devices for Industrial and Pulse Apparatus) in 1956. At the same time, he cooperated in the investigations of the Nauchno-issledovatel'skogo instituta postoyannogo toka (Direct Current Scientific Research Institute) and the Institut elektromekhaniki AN SSSR (Institute of Electromechanics AS USSR). In 1936, he became a Docent and Candidate of Technical Sciences, in 1943 Doctor of Technical Sciences and Professor. His thesis was entitled: "Generalized Theory of Lines". There is 1 figure.

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ATABEKOV, G.I.; BELOUSOV, M.M.; BULGAKOV, K.V.; VASIL'YEV, D.V.; YEGIZAROV, I.V.; ZAKHAROV, S.N.; ZEYLIDZON, Ye.D.; KOSTENKO, M.P.; MANOYLOV, V.Ye.; NARNEVSKIY, B.I.; RYZHOV, P.I.; SOLOV'YEV, I.I.; SYROMYATNIKOV, I.A.; FABRIKANT, V.L.; CHERNIN, A.B.; CHERNOBROVOV, N.V.; FEDOSEYEV, A.M.; SHABADASH, B.I.; SHCHEDRIN, N.N.; FATEYEV, A.V.

Viktor Ivanovich Ivanov, 1900-1964; an obituary. Elektrichestvo no.11:89 N '64. (MIRA 18:2)

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ATABEKOV, G.I.; BASHARIN, A.V.; BOGORODITSKIY, N.P.; BULGAKOV, K.V.; VASIL'YEV, D.V.; YEGIAZAROV, I.V.; YERMOLIN, N.P.; KOSTENKO, M.P.; MATKHANOV, P.N.; NOVASH, V.I.; NORNEVSKIY, B.I.; RUTSKIY, A.I.; RYZHOV, P.I.; SOLOV'YEV, I.I.; SOLODNIKOV, G.S.; SLEPYAN, Ya.Yu.; SMIROVA, N.V.; TINYAKOV, N.A.; FATEYEV, A.V.; FEDOSEYEV, A.M.; SHABADASH B.I.; SHCHEDRIN, N.N.

Viktor Ivanovich Ivanov, 1900-1964; obituary. Izv. vys. ucheb. zav.; energ. 8 no.1:122-123 Ja '65.

(MIRA 18:2)

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ALEKSEYEV, A.Ye.; BULGAKOV, K.V.; ZILITINKEVICH, S.I.; IVANOV, V.I.; PETROV, I.I.; RYZHOV, P.I.; SYROMYATNIKOV, I.A.; TIMOFEYEV, V.A.; SHCHEDRIN, N.N.; FATEYEV, A.V.

Sixtieth anniversary of the birth of Dmitrii Vasil'evich Vasil'ev. Elektrichestvo no.3:93 Mr '62. (MIRA 15:2)
(Vasil'ev, Dmitrii Vasil'evich, 1901-)