"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ZIMAN, Yan L'vovich; ARZHANOV, Ye.P., red.

[Problems and exercises on airplane piloting for aerial photography] Zadachi i uprazhneniia po samoletovozhdeniiu pri aerofotos"emke. Moskva, Nedra, 1964. 238 p. (MIRA 17:12)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SOV/84-58-11-50/58

AUTHORS: Arzhanov, Yu., Krasovitskiy, M.

TITLE: Difficult Road (Trudnyy put')

PERIODICAL: Grazhdanskaya aviatsiya, 1958, Nr 11, pp 36-37 (USSR)

ABSTRACT: The authors describe the arrival of two Super Aero planes at Vnukovo airfield from Czechoslovakia on their way to the Mongolian Peoples Republic. Of the two Soviet navigators on board serving as guides, one Rotislav Gatovskiy spoke Czech which he had learned while confined in prison camps during World War II. Vadim Margorin was the second navigator. There is one photograph of Rotislav Gatovskiy.

Card 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANOVA, A.I.

Psychology club. Vop. psikhol. 3 no.4:188-190 Jl-Ag '57.
(Psychology--Study and teaching) (MLRA 10:9)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

BOLTUNOVA, T.V. (Orel); ARZHANOVA, I.G. (Orel); BOLOTOVA, O.G. (Orel)

Treatment of chronic tonsillitis. Vop. okhr. mat. i det. 6 no.6:16-18 Je '61. (MIRA 15:7)

(TONSILS--DISEASES)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SUSLOV, A.; STEPANOVA, V.; SAMOGLYADOVA, A., tekhnolog; ARZHANOVA, Ye., master pyatnovyvodki

Time does not wait. Mast.prom. i khud.promys. 4 no.4:13 Ap '63. (MIRA 16:10)

1. Ivanovskaya fabrika khimicheskoy chistki i krasheniya odezhdy. 2. Direktor Ivanovskoy fabriki khimicheskoy chistki i krasheniya odezhdy (for Suslov). 3. Glavnyy inzh. Ivanovskoy fabriki khimicheskoy chistki i krasheniya odezhdy (for Stepanova).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

FOMICHEV, V.P., kand. tekhn. nauk; ARZHANOVSKOV, A.I., inzh.; ZHEREBKOV, I.V., red.

[Resistance of hard and frozen ground to cutting] Soprotivlenie rezaniiu tverdykh i merzlykh gruntov. Rostov-na-Donu, 1962. 38 p. (MIRA 17:4)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut po stroitel'stvu, Rostov-on-Don.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SHVETSOV, L.; ARZHANOY, A.; GRIDCHIN, V.

The gates of the fire stations open faster. Pozh. delo 9 no.9: 23 S '63. (MIRA 16:10)

(Fire departments—Equipment and supplies)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANTSEV, P.Z., kand. med. nauk, polkovnik meditsinskoy sluzhby

Treatment of linear and gunshot fractures of the mandible; clinical experimental study. Voen.-med.zhur. no.11:30-35 '64. (MIRA 18:5)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANTSEV, P.Z.

Using sponges and tampons of biological material in stomatological surgery. Stomatologiia 37 no.2:63-64 Mr-Ap '58. (MIRA 11:5)

1. Iz kliniki chelyustno-litsevoy khirurgii i stomatologii (nachal'nik-prof. M.V. Mukhin) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M. Kirova.
(MOUTH--SURGERY)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANUKHIN, A. (g.Vol'sk)

Increasing the productivity of cement mills. Stroi.mat. 3 no.8:28-29 Ag '57. (MLRA 10:10)

1. Starshiy konstruktor zavoda "Bol'shevik."
(Crushing machinery)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

AGEYKIN, Ya. S., kand. tekhn. nauk; ARZHANUKHIN, G. V.

Elastic rubber coupling for transmissions of multiaxle motor vehicles. Avt. prom. 29 no.5:24-25 My '63. (MIRA 16:4)

(Motor vehicles—Transmission devices)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

KULEBAKIN, P.G., inzh.; ARZHANYKH, A.I.

Working parts of disk harrows for operation at increased speeds. Trakt. i sel'khozmash. 33 no.11:18-19 N '63. (MIRA 17:9)

1. Sibirskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta mekhanizatsii sel'skogo khozyaystva.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

KULEBAKIN, P.G., kand. sel'skokhoz. nauk; ARZHANYKH, A.I., inzh.

Studying the work of a harrow plow with inclined flat disks operating at increased speeds. Trakt. i sel'khozmash. no.4:29-31 Ap '65. (MIRA 18:5)

1. Sibirskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta mekhanizatsii sel'skogo khozyaystva.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

L 24161-65 EWT(d) Pg-4 IJP(c)

ACCESSION NR: AR5000983 S/0044/64/000/009/E043/E044

SOURCE: Ref. zh. Matematika, Abs. 9B179

AUTHOR: Arzhanykh, I. S.

TITLE: Universal canonical systems of ordinary differential equations

CITED SOURCE: Uch. zap. Tashkentsk. gos. ped. in-t. v. 38, 1963, 75-88

TOPIC TAGS: canonical Hamiltonian equation, Liouville method, chain structured, 2 membered equation, differential equation canonical system

TRANSLATION: The question of transforming systems of the usual differential equations

$$\frac{dx_\nu}{dt}=X_\nu(t,x_1,x_2,\ldots,x_N),\ (\nu=1,2,\ldots,N) \quad (1)$$

into the form of the following canonical Hamilton equations is discussed

Card 1/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

L 24161-65

ACCESSION NR: AR5000983

$$\frac{dq_\mu}{dt}=\frac{\partial H}{\partial p_\mu},\ \frac{dp_\mu}{dt}=-\frac{\partial H}{\partial q_\mu}\ (\mu=1,2,\ldots,n).$$

After a brief explanation of the two basic means of solving such a problem, the Liouville method and the Lee-Koenigs method, the author proposes other means developed by him. One of these is a method of transformation into canonical equations of the rank of the larger zero, i.e. the equations by I. S. Arzhany*kh (A-equations) in canonical form, such as:

$$\frac{dq_\mu}{dt}=\frac{\partial H}{\partial p_\mu}+\sum_{\rho=1}^{r}F_\rho\frac{\partial H_\rho}{\partial p_\mu},\ \frac{dp_\mu}{dt}=-\frac{\partial H}{\partial q_\mu}-\sum_{\rho=1}^{r}F_\rho\frac{\partial H_\rho}{\partial q_\mu}.$$

By pursuing another route, the system (1) may be transformed into the system of 2-membered equations with chain structure, i.e. a system of the form:

$$\frac{d\alpha^{(1)}}{d\tau_1}=\frac{\partial H_1}{\partial\beta^{(1)}},\ \frac{d\beta^{(1)}}{d\tau_1}=-\frac{\partial H_1}{\partial\alpha^{(1)}},\quad \frac{d\alpha^{(k)}}{d\tau_k}=\frac{\partial H_k}{\partial\beta^{(k)}},\ \frac{d\beta^{(k)}}{d\tau_k}=-\frac{\partial H_k}{\partial\alpha^{(k)}}.$$

V. Dobronravov

SUB CODE: MM ENCL: 00

Card 2/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, K. S.

1666. Vliyanie Antipirina Na Serdechnososudistuyu Sistemu. Khar'kov, 1953. 15s. 20sm. (Khap'k. Med. In-T). 100 EKZ. B. TS.-(54-51520)

SO: Knizhnaya Letopis', Vol. 1, 1955

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARCHANYKH, I. S.

Archanykh, I. S. "Equations in differentials constant with respect to contact changes", Doklady Akad. nauk UzSSR, No. 11, 1948, s. 3-7.

So: U-3261, 10 April 53, (Letopis 'Zhurnal 'nykh Statey, No. 12, 1949).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S., dotsent, kandidat fiziko-matematicheskikh nauk.

Vector potentials of surface deformations, and of surface and space forces. Biul.SAGU no.30:91-101 '48. (MLRA 9:5)
(Vector analysis) (Surfaces, Deformation of)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Mathematical Review
June 1954
Mechanics

10-5-54
LL

(2) Arzanyh, I. S. Generalization of the theorems of Jacobi and Liouville on integration of the canonical systems of Hamilton. Doklady Akad. Nauk UzSSR 1949, no. 3, 3–5 (1949). (Russian. Uzbek summary)

Write F_i' for $\partial F/\partial q_i$, F_i'' for $\partial F/\partial p_i$, and F_t for $\partial F/\partial t$. The Hamilton-Jacobi theorem is generalized to allow incorporation of "quasi-holonomic" constraints of the form $dW_\sigma=0$. Let W, W_σ, λ_σ $(\sigma=1, \cdots, s<n)$ be functions of t and q_i $(i=1, \cdots, n)$ satisfying the partial differential equations (sum over repeated indices)

$$W_t'+\lambda_\sigma W'_{\sigma t}+H(t, q, p)=0, \quad p_i=W_i'+\lambda_\sigma W'_{\sigma i},$$
$$\lambda_{\sigma t}+\lambda'_{\sigma i}H_i''=0, \quad W_{\sigma t}+W'_{\sigma i}H_i''=0,$$

there being n constants of integration c_i. Then λ_σ, W_σ, $W_i^*=\partial W/\partial c_i+\lambda_\sigma\partial W_\sigma/\partial c_i$ will be constant during the motion.

A theorem of Liouville [Whittaker, Analytical dynamics, 4th ed., Cambridge, 1937, sec. 148] is generalized as follows, omitting the assumption that the known n integrals ϕ_i are in involution: If p_idq_i-Hdt takes the canonical form $dW+\lambda_\sigma dW_\sigma$, by virtue of the equations $d\phi_i=0$, then also λ_σ, W_σ, and W_i^* are constant. *A. W. Wundheiler.*

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Aržanyh, I. S.: Integral equations of the theory of elasticity. Uspehi Matem. Nauk (N.S.) 4, no. 5(33), 176-177 (1949). (Russian)

Under consideration are the surface and volume vector potentials:

$$\bar{t}(q)=\iint_S L(q,p)\bar{\sigma}(p)dS_p, \qquad \bar{U}(q)=\iiint_T L(q,p)\bar{\tau}(p)dT_p,$$

$$\bar{w}(q)=\iint_S K(q,p)\bar{\rho}(p)dS_p, \qquad \bar{R}_u(q)=\iiint_T \bar{D}(\bar{u})dT_p;$$

L, K are certain tensors; the vector $\bar{D}(\bar{u})$ is determined by the component tensors of deformation. It is assumed that the closed surface S satisfies the Liapounoff conditions of "smoothness." It is indicated that certain systems of integral equations are to be solved for each of the four classical problems of elasticity (the first and second, interior and exterior problems). The solution of any of these systems enables determination of the corresponding vector of deformation. *W. J. Trjiteinsky* (Urbana, Ill.).

Source: Mathematical Reviews, Vol 11 No. 4

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

21318 ARZHANYKH, I. S. Zadachi variatsionnogo ischisleniya I dinamiki S integro-differentsial'nymi svyazyami. Doklady akad nauk UZSSR, 1949, No. 5, S. 6-7 - Rezyumena uzbek yaz.

SO: Letopis' Zhurnal'nykh Statey, No. 29, Moskva, 1949.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S., kandidat fiziko-matematicheskikh nauk, dotsent.

Dynamic systems of a rank larger than zero. Trudy Inst.mat.i. mekh. AN Uz.SSR no.5:96-110 '49. (MLRA 6:12)
(Differential equations, Partial) (Dynamics)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Mathematical Review
June 1954
Mechanics

10-4-54 LL

Aržanyh, I. S. A parametric form of the canonical transformations. Doklady Akad. Nauk UzSSR 1949, no. 8, 8–11 (1949). (Russian. Uzbek summary)

The Pfaffian system (see the preceding review for notation)

$$dq_i = (H_{\mu i}'' + F_{\mu\rho} H_{\rho i}')dt_\mu, \quad dp_i = -(H_{\mu i}' + F_{\mu\rho} H_{\rho i}')dt_\mu,$$

$$i = 1, \cdots, n; \ \mu = 1, \cdots, m; \ \rho = 1, \cdots, \rho_m,$$

is invariant under the contact transformation

$$W_\sigma(t_\mu, q_i, p_i) = 0, \quad p_i \delta q_i - \bar{p}_i \delta \bar{q}_i = \delta W(t_\mu, q_i, p_i)$$

if $\bar{H}_\mu = H_\mu + \partial W/\partial t_\mu + \lambda_\sigma \partial W_\sigma/\partial t_\mu$, $\bar{H}_{\mu\rho} = H_{\mu\rho}$, $\bar{F}_{\mu\rho} = F_{\mu\rho}$. There follows an application to a special case whose relevance is not discussed. *A. W. Wundheiler* (Chicago, Ill.).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Mathematical Review
June 1954
Mechanics

10-4-54

(2) Arzanyh, I. S. Characteristics of Suslov's method. Doklady Akad. Nauk UzSSR 1949, no. 12, 8–11 (1949). (Russian. Uzbek summary)

The author is intrigued by the fact that relations of the type $F(t, q_i) = 0$ [it should be $F(t, q_i) = \text{constant}$] may follow from Hamilton's equations. He verifies that the Hamilton-Jacobi theorem is still valid for such a singular system.

A. W. Wundheiler (Chicago, Ill.).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Applied Mechanics
Review

ARZHANYCH, I. S.

Mechanics (Dynamics, Statics, Kinematics)

411. I. S. Arshanikh, The vortex principle of analytical dynamics (in Russian), Doklady Akad. Nauk SSSR 65, no. 3, 613-616 (Apr. 1949).

This is a summary of the author's earlier paper [Akad. Nauk Uzbek SSR, 1948]. In familiar notations, the much-derived equation,

$$\delta(\Sigma p_i q_i - T) = \Sigma Q_i \delta_{q_i} - \Sigma(\delta p_i \delta_{q_i} - dp_i \delta_{q_i}),$$

is a form of d'Alembert's principle. The author calls

$$\partial p_i/\partial q_i - \partial p_i/\partial q_i$$

the "vortex of impulses," and the above equation "the vortex principle of dynamics." A. W. Wundheiler, USA

1950

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

USSR/Mathematics - Dynamical System 21 Apr 49
Tensor Analysis

"Nonholonomic Dynamical Systems Possessing Kinetic Potential," I. S. Arzhanykh, Inst of Math and Mech, Acad Sci Uzbek SSR, 3 pp

"Dok Ak Nauk SSSR" Vol LXV, No 6

PA156T48

Differential equations of motion for nonholonomic systems are given, according to G. K. Suslov's "Theoretical Mechanics" (1946), in tensor notation. Arzhanykh establishes conditions necessary for setting up explicit form of equations of

[redacted]

156T48

USSR/Mathematics - Dynamical System 21 Apr 49
(Contd)

motion from initial implicit statement, according to nature of various matrices. Submitted by Acad A. I. Nekrasov 3 Jan 49.

ARZHANYKH, I. S.

156T48

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Artemyev, I. S. The principle in analytical dynamics. Doklady Akad. Nauk SSSR (N.S.) 65, 613-616 (1949). (Russian)

This paper presents a summary of an earlier paper by the same author [Trudy Inst. Mat. Meh. Akad. Nauk Uzbek SSR, 1948], which was inaccessible to the reviewer. The close connection between the skew-symmetric bilinear forms $\omega(\delta, d) = \sum_i(\delta p_i dq_i - dp_i \delta q_i)$ and the Hamiltonian systems is a well-known fact. The mechanical interpretation of the latter systems is realized by the motion of a holonomic dynamical system in a conservative field of force. But as the Hamiltonian systems represent only a special case ($r=1$) of more general systems of equations of dynamical systems, which the author calls dynamical systems of the rank $r>1$, it is expected that $\omega(\delta, d)$ will play an important part in the problems of analytical dynamics. The author proposes to transform the d'Alembert-Lagrange principle

$$\sum_i (F_i - m_i \ddot{r}_i)\cdot \delta r_i = 0 \tag{1}$$

into such a form that $\omega(\delta, d)$ obtains a mechanical interpretation. It is a well-known fact that every modification of the d'Alembert-Lagrange principle uncovers new qualitative properties of the motion of dynamical systems. This fact is very well illustrated by the Gauss principle of least constraint. Also the Hamiltonian principle, being a modified form of the d'Alembert-Lagrange principle, is more useful in the mechanics of continua than its original form (1). The new vortex principle may be expressed as follows. In the motion of a dynamical system in the configuration space at any instant the possible (compatible with the constraints) variation of the associated kinetic energy is to be distributed into two components: the longitudinal (which represents the work done by the exterior forces and the local inertia forces in an arbitrary possible displacement), and the transversal component (the flow of the vortex of impulses per unit of time through an element of area, made by the actual and possible displacements):

$$\begin{aligned} &\delta E = A_t(Q+R) + \Omega(d, \delta)/dt, \quad E = -T + \sum_i p_i \dot{q}_i, \\ &p_i = \partial T/\partial \dot{q}_i, \quad \dot{q}_i = \partial E/\partial p_i, \\ &\Omega(d, \delta) = \sum_{i,j}\left(\frac{\partial p_i}{\partial q_j} - \frac{\partial p_j}{\partial q_i}\right)(\delta q_j dq_i - dq_j \delta q_i), \\ &A_t(Q+R) = \sum_i \left(Q_i - \frac{\partial p_i}{\partial t}\right)\delta q_i, \\ &\delta E = \sum_i \left(\frac{\partial E}{\partial q_i}\delta q_i + \frac{\partial E}{\partial p_i}\delta p_i\right). \end{aligned} \tag{2}$$

1/2

Source: Mathematical Reviews, 1/2 Vol 10, No. 9

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZANYH, I. S.

If one represents the flow of the vortex of impulses p_i and the work of the local forces of inertia $-dp_i/dt$ in the form $\omega(d, \delta)/dt$, then (1) is equivalent to the following equation:

$$-\delta E+\sum Q_i\delta q_i=\omega(d, \delta)/dt. \tag{3}$$

The vortex form (2) of the fundamental principle of dynamics is invariant under contact transformations. As a consequence of the vortex principle (3) the Jacobi-Hamilton method follows, if there exists a force function. If there exists a force function and the system is subject to geometrical constraints, one is led to the method of Suslov [Theoretical Mechanics, Moscow, 1944, p. 461]. In the case when the system is subject to geometrical and kinematical (nonholonomic) constraints the potential method is to be replaced by the vortex method. E. Lesmanis.

Source: Mathematical Reviews, 2/2 Vol 10, No. 9

A15

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Arzanyh, I. S. Nonholonomic dynamical systems possessing a kinetic potential. Doklady Akad. Nauk SSSR (N.S.) 65, 809-811 (1949). (Russian)

Necessary and sufficient conditions under which the equations of a nonholonomic system possessing a potential can be presented in Lagrangean form are given, using tensor analysis, as integrability conditions of a system whose coefficients are expressed in terms of the explicit equations of motion. There are some misprints. *G. Y. Rainich.*

Source: Mathematical Reviews, Vol 10, No. 10.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Arzhanyh, I. S. The invariant structure of differential equations under contact transformations. Doklady Akad. Nauk SSSR (N.S.) 66, 817–820 (1949). (Russian)

Generalizing some of his previous results [published in journals not circulated outside the USSR] the author proves the following theorem. Let $H_\nu, K_{\nu\rho}, H_{\nu\rho}, \cdots, H'_\nu, K'_{\nu\rho'}, H'_{\nu\rho'}$ ($\nu=1, \cdots, p$; $\rho=1, \cdots, r_\nu$; $\rho'=1, \cdots, r'_\nu$) be functions of $t_\nu; q_\nu, p_\nu; \cdots; q'_{\nu'}, p'_{\nu'}$ ($\nu=1, \cdots, n$; $\cdots$; $\nu'=1, \cdots, n'$) and let $F_{\sigma\nu}, G_{\sigma\nu}, \cdots, F'_{\sigma\nu'}, G'_{\sigma\nu'}$ ($\sigma=1, \cdots, p$; $\sigma=1, \cdots, s_\nu$; $\sigma'=1, \cdots, s'_\nu$) be functions of the variables mentioned above and of the parameters $\vartheta^{(\alpha)}_{\nu\alpha}, \cdots, \vartheta'^{(\alpha')}_{\nu\nu'}$ ($\alpha=1, \cdots a_{\nu\nu}$; $\cdots$; $\alpha'=1, \cdots, a'_{\nu\nu'}$), the parameters varying in domains $D_{\nu\nu}, \cdots, D'_{\nu\nu'}$ which in general are dependent on the variables $t_\nu; q_\nu, p_\nu; \cdots; q'_{\nu'}, p'_{\nu'}$. Then the separated contact transformations

$$W=W(t_\nu; q_\nu, \xi_\nu), \quad W_\mu(t_\nu; q_\nu, \xi_\nu)=0, \quad \mu=1, \cdots, m,$$

$$p_\nu=\frac{\partial W}{\partial q_\nu}+\Lambda_\mu\frac{\partial W_\mu}{\partial q_\nu}, \quad -\eta_\nu=\frac{\partial W}{\partial \xi_\nu}+\Lambda_\mu\frac{\partial W_\mu}{\partial \xi_\nu}, \quad \mu=1, \cdots, m,$$

$$\cdots$$

$$W'=W'(t_\nu; q'_{\nu'}, \xi'_{\nu'}), \quad W'_{\mu'}(t_\nu; q'_{\nu'}, \xi'_{\nu'})=0, \quad \mu'=1, \cdots, m',$$

$$p'_{\nu'}=\frac{\partial W'}{\partial q'_{\nu'}}+\Lambda'_{\mu'}\frac{\partial W'_{\mu'}}{\partial q'_{\nu'}}, \quad -\eta'_{\nu'}=\frac{\partial W'}{\partial \xi'_{\nu'}}+\Lambda'_{\mu'}\frac{\partial W'_{\mu'}}{\partial \xi'_{\nu'}},$$

$$\mu'=1, \cdots, m'$$

Source: Mathematical Reviews, Vol 11 No. 1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

transform the system of differential equations

$$dp_\nu + dt_\nu\left(\frac{\partial \bar{H}_\nu}{\partial q_\nu} + K_{\nu\nu}\frac{\partial H_{\nu\nu}}{\partial q_\nu} + \int_{D_{\nu\nu}} F_{\nu\nu}\frac{\partial G_{\nu\nu}}{\partial q_\nu}d\vartheta_{\nu\nu}\right) = 0,$$

$$dq_\nu - dt_\nu\left(\frac{\partial H_\nu}{\partial p_\nu} + K_{\nu\nu}\frac{\partial H_{\nu\nu}}{\partial p_\nu} + \int_{D_{\nu\nu}} F_{\nu\nu}\frac{\partial G_{\nu\nu}}{\partial p_\nu}d\vartheta_{\nu\nu}\right) = 0,$$

$$\cdots$$

$$dp'_{\nu'} + dt_{\nu'}\left(\frac{\partial H'_{\nu'}}{\partial q'_{\nu'}} + K'_{\nu'\nu'}\frac{\partial H'_{\nu'\nu'}}{\partial q'_{\nu'}} + \int_{D'_{\nu'\nu'}} F'_{\nu'\nu'}\frac{\partial G'_{\nu'\nu'}}{\partial q'_{\nu'}}d\vartheta'_{\nu'\nu'}\right) = 0,$$

$$dq'_{\nu'} - dt_{\nu'}\left(\frac{\partial H'_{\nu'}}{\partial p'_{\nu'}} + K'_{\nu'\nu'}\frac{\partial H'_{\nu'\nu'}}{\partial p'_{\nu'}} + \int_{D'_{\nu'\nu'}} F'_{\nu'\nu'}\frac{\partial G'_{\nu'\nu'}}{\partial p'_{\nu'}}d\vartheta'_{\nu'\nu'}\right) = 0,$$

into the system of the same structure

$$d\eta_\nu + dt_\nu\left(\frac{\partial \tilde{H}_\nu}{\partial \xi_\nu} + \tilde{K}_{\nu\nu}\frac{\partial \tilde{H}_{\nu\nu}}{\partial \xi_\nu} + \int_{\tilde{D}_{\nu\nu}} \tilde{F}_{\nu\nu}\frac{\partial \tilde{G}_{\nu\nu}}{\partial \xi_\nu}d\vartheta_{\nu\nu}\right) = 0,$$

$$d\xi_\nu - dt_\nu\left(\frac{\partial \tilde{H}_\nu}{\partial \eta_\nu} + \tilde{K}_{\nu\nu}\frac{\partial \tilde{H}_{\nu\nu}}{\partial \eta_\nu} + \int_{\tilde{D}_{\nu\nu}} \tilde{F}_{\nu\nu}\frac{\partial \tilde{G}_{\nu\nu}}{\partial \eta_\nu}d\vartheta_{\nu\nu}\right) = 0,$$

$$\cdots$$

$$d\eta'_{\nu'} + dt_{\nu'}\left(\frac{\partial \tilde{H}'_{\nu'}}{\partial \xi'_{\nu'}} + \tilde{K}'_{\nu'\nu'}\frac{\partial \tilde{H}'_{\nu'\nu'}}{\partial \xi'_{\nu'}} + \int_{\tilde{D}'_{\nu'\nu'}} \tilde{F}'_{\nu'\nu'}\frac{\partial \tilde{G}'_{\nu'\nu'}}{\partial \xi'_{\nu'}}d\vartheta_{\nu'\nu'}\right) = 0,$$

$$d\xi'_{\nu'} - dt_{\nu'}\left(\frac{\partial \tilde{H}'_{\nu'}}{\partial \eta'_{\nu'}} + \tilde{K}'_{\nu'\nu'}\frac{\partial \tilde{H}'_{\nu'\nu'}}{\partial \eta'_{\nu'}} + \int_{\tilde{D}'_{\nu'\nu'}} \tilde{F}'_{\nu'\nu'}\frac{\partial \tilde{G}'_{\nu'\nu'}}{\partial \eta'_{\nu'}}d\vartheta_{\nu'\nu'}\right) = 0,$$

where

$$\tilde{H}_\nu = H_\nu + \frac{\partial W}{\partial t_\nu} + \Delta_\nu\frac{\partial W_\nu}{\partial t_\nu},$$

$$\tilde{H}_{\nu\nu} = H_{\nu\nu}, \quad \tilde{K}_{\nu\nu} = K_{\nu\nu},$$

$$\tilde{F}_{\nu\nu} = F_{\nu\nu}, \quad \tilde{G}_{\nu\nu} = G_{\nu\nu},$$

$$\cdots$$

$$\tilde{H}'_{\nu'} = H'_{\nu'} + \frac{\partial W'}{\partial t_{\nu'}} + \Delta'_{\nu'}\frac{\partial W'_{\nu'}}{\partial t_{\nu'}},$$

$$\tilde{H}'_{\nu'\nu'} = H'_{\nu'\nu'}, \quad \tilde{K}'_{\nu'\nu'} = K'_{\nu'\nu'},$$

$$\tilde{F}'_{\nu'\nu'} = F'_{\nu'\nu'}, \quad \tilde{G}'_{\nu'\nu'} = G'_{\nu'\nu'}$$

and $\tilde{D}_{\nu\nu}, \cdots, \tilde{D}'_{\nu'\nu'}$ are the transformed domains. It should be remarked that the summation sign is omitted if an index occurs twice in a product and that the notation $\int_{D_k} F(\vartheta)d\vartheta$ means

$$\int\int\cdots\int_{D_k} F(\vartheta^{(1)}, \cdots, \vartheta^{(k)})d\vartheta^{(1)}\cdots d\vartheta^{(k)}.$$

E. Leimanis (Vancouver, B. C.).

Source: Mathematical Reviews, Vol. 1, No. 1

Article 5, J. 5.

Case 1 2/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Aržanyh, I. S. Integration of canonical systems of order greater than zero. Uspehi Mat. Nauk (N.S.) 5, no. 4(38), 144-153 (1950). (Russian)

The author considers what he terms "canonical systems of order r", that is, systems of differential equations: (1) $\dot{q}_i=(\partial H/\partial p_i)+(F_\alpha \partial H_\alpha/\partial p_i)$, $\dot{p}_i=-(\partial H/\partial q_i)-(F_\alpha \partial H_\alpha/\partial q_i)$, $i=1, \cdots, n$, and the summation convention is used for α, which runs from 1 to r. The author demonstrates various methods for obtaining integrals of such a system by finding integrals of appropriate systems of partial differential equations. The following generalization of the Hamilton-Jacobi procedure is typical of the results: Let the functions $H, H_1, \cdots, H_r$ be independent of t and be in involution. Let the partial differential equations:

$$H(q_1, \cdots, q_n, \partial W/\partial q_1, \cdots, \partial W/\partial q_n)=h,$$

$$H_j(q_1, \cdots, q_n, \partial W/\partial q_1, \cdots, \partial W/\partial q_n)=h_j \quad (j=1, \cdots, r)$$

be consistent and let

$$W(q_1, \cdots, q_n, h, h_1, \cdots, h_r, c_1, \cdots, c_{n-r-1})$$

[illegible] complete integral, the c's being arbitrary constants. [illegible] has the integrals: $p_i=\partial W/\partial q_i$, $t+c=\partial W/\partial h$, [illegible] where $i=1, \cdots, n$, $k=1, \cdots, n$ [illegible]

W. Kaplan (Ann[illegible]

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Representation of the vector of deformation by Newtonian potentials. Trudy SAGU 17:79-95 '50. (MLRA 9:5)
(Surfaces, Deformation of) (Vector analysis)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Aržanyh I. S. On the theory of integration of the dynamical equations of an isotropic elastic body. Doklady Akad. Nauk SSSR (N.S.) 79, 41–44 (1950). (Russian)

The present paper is devoted to various questions concerning the integration of the dynamical equations of an isotropic elastic body: (1) $\partial^2 u/\partial t^2 = \alpha \operatorname{grad} \operatorname{div} u - \beta \operatorname{rot} \operatorname{rot} u$, where the vector-valued function u is the displacement, and $\alpha = (\lambda+2\mu)/\rho$, $\beta = \mu/\rho$, where λ and μ are Lamé's constants of elasticity, and ρ is the density of the body. The author first gives certain general representations of solutions of (1) in terms of arbitrary functions, which extend known results in the static case (when $\partial^2 u/\partial t^2$ is replaced by zero). Let S denote a smooth surface, and Q denote either its interior or its exterior. If Q is the exterior of S then u is required to be "regular at infinity," in addition to satisfying (1). Using a lemma derived previously, the author derives integral equations which are equivalent to the solution of certain free and forced vibration problems for the body Q.

J. B. Diaz (College Park, Md.).

Source: Mathematical Reviews, Vol. No.

Inst. Math + Mech, Acad. Sci Uz SSR.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Arzanyh, I. S. A vortex interpretation of the theory of functions of a complex variable. Doklady Akad. Nauk SSSR (N.S.) 73, 667–670 (1950). (Russian)

Let $F(\zeta)=\varphi+i\psi$, $\zeta=x+iy$, be an analytic function interpreted as the complex potential of a steady incompressible flow. The author observes that this flow may be transformed into a rotational three-dimensional flow by assuming a z-component of the velocity vector $\theta(\psi)$, where θ is an arbitrary function. The vorticity $(\Omega_x, \Omega_y, \Omega_z)$ of this flow is given by $\Omega_x - i\Omega_y = F'\theta'$, $\Omega_z = 0$. The stream surfaces are given by (1) $\psi=$ const., (2) $z=\theta(\psi)\int\{|d\zeta/dF|^2 dF\}_{\psi=\text{const.}}+\omega(\psi)$, where ω is an arbitrary function. The author calls (1) the equation of the wing and (2) that of the fuselage. For a given $\psi(x,y)=a$ an equation $z=V(x,y)+c$ will represent a possible fuselage if and only if (*) $(\partial/\partial(x,y))\{\partial(V,\psi)/\partial(x,y),\psi\}=0$. The totality of all fuselages obtained in this way is described by a complicated partial differential equation obtained from (*) by eliminating ψ by means of Laplace's equation. Similar considerations are carried out for the unsteady case, $F=F(\zeta,t)$.

L. Bers (Los Angeles, Calif.).

Source: Mathematical Reviews, Vol 12 No. 8

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Aržanyh, I. S. The integral equations of steady motion of a viscous incompressible fluid. Doklady Akad. Nauk SSSR (N.S.) 74, 21–24 (1950). (Russian)

The author considers the following two problems for viscous incompressible fluids: (1) the motion of a fluid inside a closed rigid container rotating with constant angular velocity; (2) the motion of a fluid outside a rigid body moving with constant velocity, the fluid being at rest at infinity. The author shows that the absolute velocity and the pressure can be expressed in terms of quantities determined by seven (two vectors and a scalar) integral equations which are nonlinear inasmuch as the vector product of the two unknown vector functions enters. Simplifications for slow motion and the possibility of solving the equations by a series expansion are discussed briefly.

J. V. Wehausen (Providence, R. I.).

Mathematical Reviews, Vol. 12 No. 5

Inst. Math. Mech. Acad. Sci. Uz SSR

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Aržanyh, I. S. The integral equations of the deformation vector of the statics of an isotropic elastic body. Doklady Akad. Nauk SSSR (N.S.) 75, 783-786 (1950). (Russian)

Let $u=(u_1, u_2, u_3)$ be the displacement vector of a three-dimensional isotropic elastic body occupying a bounded domain Q possessing a smooth boundary surface S. The displacement u satisfies the system of differential equations of equilibrium:

$$\mu\nabla^2 u+(\lambda+\mu)\nabla \operatorname{div} u+f=0,$$

where λ and μ are Lamé's constants of elasticity and f is the body force. Assuming that the domain Q possesses a Green's function G for the Dirichlet problem, the author obtains, in terms of G, an integral equation satisfied by the displacement u in the case of the first boundary value problem of elasticity, when u is prescribed on the boundary S. Analogously, assuming that the domain Q possesses a Green's function N for Neumann's problem, an integral equation satisfied by u, the kernel of the integral equation involving N, is obtained when u is a solution of the second boundary value problem of elasticity when the surface forces are prescribed on S. The derivation of the integral equations is based on two integral equations for the dilatation, div u, obtained previously [same Doklady (N.S.) 73, 41-44 (1950); see Rev. 12, 651]. J. L. Davis (College Park, Md.).

Source: Mathematical

13

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Source: Mathematical Reviews, Vol. 13 No. 2

Aržanyh, I. S. Integral equations for the representation of the vector of translation, spatial dilatation, and rotation of an elastic body. Akad. Nauk SSSR. Prikl. Mat. Meh. 15, 387–391 (1951). (Russian)

The displacement vector $u(x_1, x_2, x_3, t)$ of a three-dimensional homogeneous isotropic elastic body occupying a domain Q (which is either the interior or the exterior of a closed surface S) satisfies in Q the following system of equations

$$\mu\nabla^2 u + (\lambda+\mu)\,\mathrm{grad}\,\mathrm{div}\,u + \rho b = \rho\partial^2 u/\partial t^2,$$

where λ and μ are Lamé's constants, ρ is the density, and b is the body force per unit mass. In the first boundary value problem, the displacement u is assigned on S, while in the second boundary value problem the surface traction (n is the outer normal to S and $\times$ denotes the vector product)

$$2\mu\partial u/\partial n + \lambda n\,\mathrm{div}\,u + \mu n\times\mathrm{rot}\,u = f$$

is assigned on S. In the exterior problem (Q is the exterior of S) u is required to be regular at infinity. In the present paper the author obtains integral equations for the Laplace transforms of the displacement u, the dilatation div u, and rot u, in terms of the usual Green's function for the Dirichlet problem in the case of the first boundary value problem, and Neumann's function in the case of the second boundary value problem.

J. B. Diaz (College Park, Md.).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Aržanyh, I. S. The integral equations of the dynamics of an elastic body. Doklady Akad. Nauk SSSR (N.S.) 76, 501–503 (1951). (Russian)

Consider the problem of finding integral equations satisfied by the displacement u of a three-dimensional isotropic elastic body, which satisfies the system:

$$\mu\nabla^2 u+(\lambda+\mu)\nabla \operatorname{div} u+lu=f,$$

where λ and μ are Lamé's constants, l is a parameter, and f is a given function. The displacement u is subjected either to the first boundary condition, displacement prescribed on the boundary, or to the second boundary condition, surface forces prescribed on the boundary. V. D. Kupradze [Boundary problems in the theory of vibrations and integral equations, Moscow, 1950] has given integral equations whose kernels involve the parameter l. The author [same Doklady (N.S.) 73, 41–44 (1950); these Rev. 12, 651] has given integral equations whose kernels involve the Green's functions for the Dirichlet and Neumann problems. In the present paper the author derives integral equations whose kernels do not depend on l or on the aforementioned Green's functions.

J. B. Diaz (College Park, Md.).

Source: Math

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Arzanyh, I. S. A new solution of the problem of the computation of a vector from its curl and divergence. Doklady Akad. Nauk SSSR (N.S.) 79, 29-32 (1951). (Russian)

The curl and the divergence of the unknown vector are specified in a region, and also its normal component on the boundary, which may be interior or exterior. If the given curl-function has a certain special form, the vector can be found by the theory of Neumann's problem. To express the curl-function in this form the theory of Dirichlet's problem is used. A solution of a more general problem is indicated. Hydromechanical and electromagnetic examples are discussed. *F. V. Atkinson* (Ibadan).

Source: Mathematical Reviews, Vol. 13, No. 5

Inst. Math + Mech., AS. UZSSR

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

USSR/Physics - Elastic Bodies, Equations of 1 Dec 51

"The Fundamental Integral Equations of Dynamics of Elastic Bodies," I. S. Arzhanykh, Inst Math and Mech, Acad Sci Uzbek SSR

"Dok Ak Nauk SSSR" Vol LXXXI, No 4, pp 513-516

Curl and divergence (body expansion) are the basic quantities that det the deformation process in elastic bodies. Author constructs new integral eqs for expressing these quantities according to Laplace's representation. Cf. V. D. Kupradze, "Boundary-Value Problems of the Theory of

202T84

USSR/Physics - Elastic Bodies, Equations of (Contd) 1 Dec 51

Oscillations and Integral Equations," Moscow, 1950. Submitted by Acad A. I. Nekrasov 30 Sep 51.

202T84

ARZHANYKH, I. S.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

USSR/Mathematics - Matrices 11 Dec 51

"Extension of A. N. Krylov's Method to Polynomial Matrices," I. S. Arzhanykh, Inst of Math and Mech, Acad Sci Uzbek SSR

"Dok Ak Nauk SSSR" Vol LXXXI, No 5, pp 749-752

Krylov proposed an effective method for computing the coeffs of a characteristic eq in the theory of oscillations of material systems (see "Izvestiya Akademii Nauk SSSR, Otdeleniye Matematicheskikh i Yestestvennykh Nauk" No 4, pp 463 and 491, 1931). The algebraic basis of this method is the familiar Hamilton-Cayley. Submitted by Acad A. I. Nekrasov 11 Oct 51.

210T68

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

USSR/Physics - Mechanics of Fluids 1952

"Investigations Into the Mechanics of a Continuous Medium," I. S. Arzhanykh

Tr Inst Mat i Mekh, Ak Nauk Uzbek SSR, No 9, pp 60-101

Exposition of author's new results on hydrodynamics of an ideal and viscous fluid and on elasticity theory, reported at sessions of the Institute of Mathematics and Mechanics and Central-Asiatic State University and published in abbreviated form in Dok Ak Nauk SSSR and Dok Ak Nauk Uzbek SSR. Present

248T97

article is continuation of his previous two works on construction of integral eqs of fluid mechanics and contains the vortical interpretation of theory of functions of complex variable, hydrokinetic interpretation of Newtonian forces, and representation of strain vectors by wave functions.

248T97

248T97

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

PA 248T95

USSR/Mathematics - Mechanics 1952

"Involutional Systems of Rank Zero," I. S. Arzhanykh

Tr Inst Mat i Mekh, Ak Nauk Uzbek SSR, No 9, pp 102-123

Considers the canonical system of rank zero: q_n dH/dp_n, $pn = -dH/dq_n$ $(n = \overline{1,N})$, which is called involutional if the canonical potential H can be represented in the form $H = H_o(q_1,..,q_N; p_1,..,p_N) + G(t; H_1,..,H_r)$ where H_s is in the involution $(H_s, H_r) = 0$ and in the involution with function H_o.

248T95

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

USSR/Physics - Field Theory 1 Feb 52

"Resolvents of the Basic Problems of Field Theory," I. S. Arzhanykh, Inst of Math and Mech, Acad Sci Uzbek SSR

"Dok Ak Nauk SSSR" Vol LXXXII, No 4, pp 545-548

The fundamental problems of field theory which follow from the hydrodynamics of viscous and ideal fluids, theory of elasticity and electrodynamic consist of the following: in the region Q+S it is required to det a vector v(p) proper (Q in S) or regular (Q outside S) satisfying the partial deriv eqs curl v = $\vec{V}$, div v Q and the corresponding

213T109

boundary conditions. Constructs solns with the aid of resolvents D(t,s) of certain integral eqs. Submitted by Acad A. I. Nekrasov 10 Dec 51.

213T109

ARZHANYKH, I. S.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Arzanyh, I. S. Functions of the stress tensor of hydrodynamics. Doklady Akad. Nauk SSSR (N.S.) 83, 195-198 (1952). (Russian)

Hydrodynamic analogs of Maxwell's and Morera's stress functions in elasticity can be found as follows. Write the hydrodynamic equations (1) $\partial\rho/\partial t+\operatorname{div}(\rho\mathbf{v})=0$, (2) $\partial(\rho\mathbf{v})/\partial t+\operatorname{div}(\rho\mathbf{v}\mathbf{v}-P)=0$, where ρ is the density, $\mathbf{v}$ the velocity, P the stress tensor, and

$$\operatorname{div}(\rho\mathbf{v}\mathbf{v})=\rho\,\mathbf{v}\cdot\operatorname{grad}\mathbf{v}+\mathbf{v}\operatorname{div}(\rho\mathbf{v}).$$

By (1) $\rho=\operatorname{div}\mathbf{a}_1$, $\rho\mathbf{v}=-\partial\mathbf{a}_2/\partial t+\operatorname{curl}\mathbf{a}_3$ for some vectors $\mathbf{a}_1$ and $\mathbf{a}_3$, and similarly each component of $\rho\mathbf{v}$ and each row of $\rho\mathbf{v}\mathbf{v}-P$ is expressible in terms of div and curl of vectors $\mathbf{a}_1,\cdots,\mathbf{a}_6$. The two forms for $\rho\mathbf{v}$ and the symmetry of $\rho\mathbf{v}\mathbf{v}-P$ yield six more equations of the form $\partial b/\partial t+\operatorname{div}\mathbf{c}=0$ involving the twenty-four components of $\mathbf{a}_1,\cdots,\mathbf{a}_6$, which are now expressible in terms of div and curl of new vectors $\mathbf{A}_1,\cdots,\mathbf{A}_{12}$. Eventually ρ, $\rho\mathbf{v}$, and $\rho\mathbf{v}\mathbf{v}-P$ can be expressed as linear combinations, with coefficients ±1 or 0, of second partial derivatives of twenty-one independent linear combinations of components of $A_1,\cdots,A_{12}$. Conversely, if these twenty-one hydrodynamic "stress" functions are chosen arbitrarily of class C_2 in t, x, y, z, then ρ, $\rho\mathbf{v}$, and P defined with their aid satisfy (1) and (2). *J. H. Giese.*

Source: Mathematical Reviews, Vol 13 No. 10

Inst. Math. & Mech. AS. UzSSR.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

USSR/Mathematics - Integral Representation 1 Jul 52

"Integral Representation of a Vector Field," I. S. Arzhanykh, Inst of Math and Mech, Acad Sci Uzbek SSR

"Dok Ak Nauk SSSR" Vol LXXXV, No 1, pp 55-58

In solving boundary-value problems one makes important use of Green's formulas, which det the desired quantity by means of its boundary values and those elements defined by the differential eqs of the problem in question. Here the author constructs a formula of this type for solving those problems of hydrodynamics, elasticity theory and

224T88

electrodynamics which are connected with the differential eqs of the classical field theory rotv $\vec{\Omega}$ and divv = θ. Submitted by Acad A. I. Nekrasov 26 Apr 52.

224T88

ARZHANYKH, I.S.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Conditions Governing the Applicability of the Potential Method for Integrating the Equations of Motion of Nonholonomic Conservative Systems, I.S.Arzhanykh, Inst of Math and Mech, Acad Sci Uzbek SSR, DAN SSSR, Vol 87, No 1, pp 15-18, Nov 52.

S.A.Chaplygin was first to show, in 1912, that in certain cases the eqs of motion of nonholonomic systems can be integrated by the Hamilton-Jacobi method, from which it follows that nonholonomic systems do not always admit this method. Therefore, the problem naturally arises as to those conditions which must be satisfied by nonholonomic systems for applicabiltiy of the Hamilton-Jacobi method. Presented by Acad A.I.Nekrasov 1 Sep 52.

252T77

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Among the papers presented by the First All-Union Conference on Aerohydrodynamics (8-13 Dec 1952) convened by the Institute of Mechanics, Academy of Sciences USSR, was:

"Some New Problems of the Integration of Differential Equations in Hydrodynamics" by Arzhanykh, I. S. (Institute of Mathematics and Mechanics, Uzbek Academy of Sciences)

SO: Izvestiya AN USSR, Otdeleniye Tekhnicheskikh Nauk, No. 6, Moscow, June 1953, (W-30662, 12 July 1954)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

"Development o f Mathematics and Mechanics in Uzbekistan"

Izv AN Uzb SSR, No 6, 1953 pp 102-105
abs
W-31098, 26 Nov 54

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Arzanyh, I. S. Stress tensor functions for the dynamics of an elastic body. Dokl. Akad. Nauk Uzbek. SSR. 1953, no. 7, 3–4. (Russian. Uzbek summary). FW 3

Using the method empoyed in a previous paper [Dokl. Akad. Nauk SSSR (N.S.) 83 (1952), 195–198; MR 13, 1000] the author obtains a representation for solutions of the dynamical equations of an elastic body (three displacement components and six stress components) in terms of twenty one arbitrary, sufficiently differentiable functions of x, y, z, t. The present formulas reduce to the known Maxwell-Morera representation formulas in the static case [cf. A. Krutkov, Stress tensor functions and general solutions in the static theory of elasticity, Izdat. Akad. Nauk SSSR, Moscow, 1949]. *J. B. Diaz.*

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Mathematical Reviews
Vol. 15 No. 4
Apr. 1954
Analysis

8-24-54
LL

Aržanyh, I. S. On integration of a canonical system of equations in exact differentials. Uspehi Matem. Nauk (N.S.) 8, no. 3(55), 99–104 (1953). (Russian)

The author is dealing with a generalisation of the methods given by Poisson and Jacobi to integrate systems of the type

$$(*)\quad dq_\nu = \sum_{\sigma=1}^{s} \frac{\partial H_\sigma}{\partial p_\nu} dt_\sigma, \quad dp_\nu = -\sum_{\sigma=1}^{s} \frac{\partial H_\sigma}{\partial q_\nu} dt_\sigma \quad (\nu = 1, 2, \cdots, n).$$

The following theorems are proved. (1) If

$$\Phi(t_1, \cdots, t_s, q_1, \cdots, q_n, p_1, \cdots, p_n) = A,$$
$$\Psi(t_1, \cdots, t_s, q_1, \cdots, q_n, p_1, \cdots, p_n) = B$$

are integrals of a completely integrable system (*) the constant Poisson-bracket $(\Phi\Psi) = C$ is again an integral of this system. (2) If $V(t_1, \cdots, t_s, q_1, \cdots, q_n, a_1, \cdots, a_n)$ is a complete integral of the partial differential system

$$\frac{\partial V}{\partial t_\sigma} + H_\sigma\left(t_1, \cdots, t_s, q_1, \cdots, q_n, \frac{\partial V}{\partial q_1}, \cdots, \frac{\partial V}{\partial q_n}\right) = 0, \quad \sigma = 1, 2, \cdots, s,$$

the solution of the system (*) associated with this partial system is given by

$$p_\nu = \frac{\partial V}{\partial q_\nu}, \quad \frac{\partial V}{\partial a_\nu} = b_\nu \quad (\nu = 1, 2, \cdots, n)$$

(as a generalization of Jacobi's theorem). Further conclusions follow in the case that the expressions H_σ are independent of the parameters $t_1, \cdots, t_s$. Finally an example is

M. Pinl (Dacca).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Mathematical Reviews
Vol. 15 No. 3
March 1954
Analysis

6-24-54

Arianyh, I. S. Parametric representation of solutions of a system of linear functional equations in commutative operators. Uspehi Matem. Nauk (N.S.) 8, no. 3(55), 157-160 (1953). (Russian)

The author considers equations of the form

$$\sum_{\mu=1}^{n} A_{\nu\mu} U_\mu = 0 \quad (\nu = 1, \cdots, n),$$

where the $A_{\nu\mu}$ are linear commutative operations (operators which are elements of a commutative ring). He observes that, if $\Phi_1, \cdots, \Phi_n$ are solutions of the equation $\Delta\Phi = 0$, where Δ = determinant $A_{\nu\mu}$, and if $(-1)^{\nu+\mu}\Delta_{\nu\mu}$ is the cofactor of $A_{\nu\mu}$ in the matrix $\|A_{\nu\mu}\|$, then the above equations are satisfied by

$$U_\nu = \sum_{\mu=1}^{n} (-1)^{\nu+\mu} \Delta_{\nu\mu} \Phi_\mu \quad (\nu = 1, \cdots, n).$$

To illustrate the applications of this result, the author uses it to obtain general solutions to the Cauchy-Riemann equations, Oseen's equations, and the equations of linear elasticity.

J. L. Ericksen (Washington, D. C.)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Arzanyh, I. S. Representation of the dynamical displacement vector by dependent wave functions. Dokl Akad Nauk Uzbek. SSR 1953, no. 10 3-5 (Russian Uzbek summary)

In a previous paper (same Dokl 1953, no. 3, 3-7) the author has given representations for the displacement vector u satisfying Lamé's equations of three dimensional elasticity

$$\alpha \operatorname{grad} \operatorname{div} u - \beta \operatorname{rot} \operatorname{rot} u - \frac{\partial^2 u}{\partial t^2} = F,$$

in terms of independent wave functions. In the present note several other representations are given, involving wave functions which are related by subsidary equations.

J. B. Diaz (College Park, Md.)

1-FW

1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZANYKH, I. S.

1-F\W

Arzanyh, I. S. Construction of the integral equations of statics in the theory of elasticity by means of Green's functions. Akad. Nauk Uzbek. SSR. Trudy Inst. Mat. Meh. 10 (1953), no. 2, 5-25. (Russian)

Consider a smooth simple closed surface S in three dimensional space, with interior Q, and let Γ and N denote, respectively, the Green's function and the Neumann function for the solution of the Dirichlet and Neumann boundary value problems for Laplace's equation for $Q+S$. The author remarks that the starting point of this paper was the following question: can the solution of the first and second boundary value problems of the theory of elasticity be computed explicitly in terms of the given data and of the functions Γ and N? To this question the author gives what he terms a negative answer, by deriving only singular and regular integral equations (involving Γ and N) which are satisfied by the displacement vector of the first and second boundary value problems of static elasticity. The first part of the paper is devoted to singular integral equations, whose derivation is based upon a representation (in terms of harmonic functions) of solutions of Lamé's equations of static elasticity. The relationship with earlier results of L.

1/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Anzanyn, I. S.

3

1-F\W

1

Lichtenstein [Math. Z. 20 (1924), 21–28] is worked out. The second part of the paper is devoted to regular integral equations, whose derivation is based upon an integro-differential equation which is equivalent to Lamé's equation

$$\mu\nabla^2 u+(\lambda+\mu)\,\mathrm{grad}\,\mathrm{div}\,u+\rho f=0.$$

Here the relationship to the results of E. and F. Cosserat [C. R. Acad. Sci. Paris 126 (1898), 1089–1091, 1129–1132; 127 (1898), 315–318; 133 (1901), 145–147, 210–213, 271–273, 400, 326–329, 361–364, 382–384] is made explicit.

J. B. Diaz (College Park, Md.).

2/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Qualitative differences between holonomic and non-holonomic systems. Truly Inst.mat. i mekh. AN Uz.SSR no.10:179-185 part 2. '53.
(Mechanics, Analytic)
(MIRA 8:4)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Elasticity

Vectorial potentials of the dynamics of an elastic body, Dokl. AN SSSR 88, No. 6, 1953.

Presents principal results of a new construction of the vector potentials for the star-delta operator, a·grad div-b·rot rot-k^2, which occurs in the dynamics of an isotropic elastic body. Expounds a method which differs essentially from that of V.D.Kupradze, author of "Boundary-Value Problems of the Theory of Oscillations, and Integral Equations" (Granichnyye Zadachi Teorii Kolebaniy i Integral'nyye Uravneniya), Moscow, 1950. Presented by Acad A.I.Nekrasov 25 Dec 52.

258T114

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Mathematical Reviews
Vol. 15 No. 2
Feb. 1954
Mechanics

(1)

Arzhanyh, I. S. On a theorem of Hamilton-Jacobi type. Doklady Akad. Nauk SSSR (N.S.) 91, 463-466 (1953). (Russian)

For the sake of brevity the notations and the wording of the theorem have been somewhat modified in this review. Consider $2n$ equations of the form $\dot{q}=\partial H/\partial p$, $\dot{p}=-\partial H/\partial q+\pi$ where $\pi=\Pi(q, p)$. Put $K(q, p)=H^*(q, \pi)$. Let V and W be functions of q (but not of p), and write V' and W' for their gradients (in q). If V satisfies the equation (1) $V=H^*(q, V')$ and the functions $\pi-V'$ are in involution (relative to the base q, p), then the equations $\Pi(q, W')=V'$ are compatible in W; and the equations of motion become $\partial(V-W)/\partial q=0$.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Arzhanykh, I. S.

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
Arzhanykh, I. S.	Study of the mechanics of a uniform medium	Institute of Mathematics and Mechanics, Academy of Science Uzbek SSR

SO: W-30604, 7 July 1954

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

"Functions of the Tensor of Stresses of an Electromagnetic Field"
Dokl. AN UzSSR, No 2, 1954, 3-7 (Uzbek resume)

Making use of the fact that a tensor whose divergence equals zero can always be added to the tensor of an electromagnetic filed's impulse energy, the author gives a new expression for the tensor determining the four-dimensional vector of a force. This expression contains 21 arbitrary triply differentiable functions. The author notes that the auxiliary tensor can be regarded as the characteristic of a natural stress of the space-time continuum. (RZhMat, No 9, 1955)

SO: Sum-No 787, 12 Jan 56

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

On a Problem of Electrodynamics

The author proves the following uniqueness theorem for an electromagnetic field in a space free of charges: A field at a point p is uniquely determined by assigning over a surface, enclosed within a sphere of radius ct, the normal components of the field at the initial moment t= 0 and the tangential components for all moments from 0 to t. The proof is conducted by direct construction of the solution. (RZhMat, No. 8, 1955) Dokl. An Uzbek SSR, No. 6, 1954, 3-5 (Uzbek resume).

SO: Sam. No. 744, 8 Dec 55 - Supplementary Survey of Soviet Scientific Abstracts (17)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARCHANYKH, I. S.

2

2007. Archanykh, I. S., Representation of the static displacement vector of an elastic body by independent harmonic functions (in Russian), *Report of Acad. of Sciences of Uzbekistan SSR* no. 8, 3-7, 1934; *Ref. Zh. Mekh.* 1936, Rev. no. 3[illegible]6.

The problem is examined of the general solution of the Lamé equation

$$(\lambda + 2\mu)\ \mathrm{grad\ div}\ \bar{u} - \mu\ \mathrm{rot\ rot}\ \bar{u} = \bar{F} \qquad [1]$$

$\bar{u}$ is a displacements vector, $\bar{F}$ vector of volume forces, μ, λ are Lamé constants.

The general solution can be written in the form

$$\bar{u} = \bar{A} + \bar{B} - \alpha\,\mathrm{rot}\,(rA) - \beta\ \mathrm{grad}\,(r\bar{B}) \qquad [2]$$

$$\gamma\nabla^2\bar{A} = \bar{F} + \beta\bar{r}\ \mathrm{div}\ \bar{F}$$

$$\gamma\nabla^2 B = \bar{F} + \alpha[\bar{r}\ \mathrm{rot}\ \bar{F}]$$

$$\alpha = \frac{\lambda + \mu}{2\mu}, \quad \beta = \frac{\lambda + \mu}{2(\lambda + 2\mu)}, \quad \gamma = \tfrac{1}{2}(3\lambda + 7\mu)$$

In the case of the absence of volume forces the vectors $\bar{A}$ and $\bar{B}$ which enter into [2] are harmonic, and the general solution contains six harmonic functions.

1/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Further, the author notes that, for the solution of three-dimensional problems of the theory of elasticity, it is possible to put three of the six harmonic functions which enter in [2] equal to zero. As was shown in the work of the abstractor (See *Ref. Zh. Mekh.* 1954, Rev. 4872), the problem of the generality of one or the other form of solution expressed by three harmonic functions, requires special examination and also depends essentially upon the cohesion of the generality.

M. G. Slolodyanskii, USSR

Courtesy Referativnyi Zhurnal

Translation, courtesy Ministry of Supply, England

MT

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

USSR/Mathematics - Integration FD-1163

Card 1/1 Pub. 118-4/30

Author : Arzhanykh, I. S.

Title : A method for integrating first-order partial differential equations

Periodical : Usp. mat. nauk, 9, No 3(61), 115-118, Jul-Sep 1954

Abstract : The author considers the equation $F(z; x_1,\ldots,x_n; p_1,\ldots,p_n)=0$ $(p_i=dz/dx_i)$. He supplements the familiar methods of Lagrange, Jacobi, and Cauchy for constructing the solution $z(x_1,\ldots,x_n)$ based upon the uniformization of the system $F=0$ $(p_i=dz/dx_i)$ relative to z, p, in analogy to the Hamilton-Jacobi system of equations. No references.

Institution :

Submitted : June 24, 1953

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

USSR/Mathematics - Characteristics FD-1164

Card 1/1 Pub. 118-5/30

Author : Arzhanykh, I. S.

Title : Extension of the method of characteristics to conjoint equations in first-order partial derivatives

Periodical : Usp. mat. nauk, 9, No 3(61), 119-125, Jul-Sep 1954

Abstract : The author considers a system of first-order partial differential equations with one unknown function: $F_r(x_1,..,x_n; z; p_1,..,p_n)=0$ ($p_i=dz/dx_i$; $r=1,..,m$; $i=1,..,n$), which is solved by generalization of characteristic lines of Cauchy; namely, the author replaces the characteristic lines by characteristics of hypersurfaces.

Institution :

Submitted : December 1, 1953

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

1-AW

Artanyh, I. S. Dynamical potentials of the theory of elasticity. Akad. Nauk Uzbek. SSR. Trudy Inst. Mat. Meh. 13 (1954), 3-1[illegible] (Russian)

The system of partial differential equations for the displacement vector $u=u(x, y, z, t)$ in the dynamical theory of elasticity is

$$(\alpha \operatorname{grad} \operatorname{div} - \beta \operatorname{rot} \operatorname{rot} - \partial^2/\partial t^2)u = f,$$

where α and β are elastic constants. After giving a general formula for the representation of solutions of this equation, and determining explicitly a "fundamental solution", the author proves a formula which is analogous to the formula of Kirchhoff in the theory of the wave equation. The various "retarded potentials" occurring in this "generalized Kirchhoff formula" are then analyzed, and integro-differential equations for the solution (displacement vector) of the first and second boundary value problems are deduced.

J. B. Diaz.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Arzanyh, I. S. Integral equations of the fundamental problems of the theory of a field. Akad. Nauk Uzbek. SSR. Trudy Inst. Mat. Meh. 11 (1954), 19-41. (Russian)

The problem mentioned in the title is that of determining a vector valued function $v=v(x, y, z)$ satisfying the partial differential equations $\operatorname{rot} v=\mathfrak{U}$, $\operatorname{div} v=\Theta$ in an open set Q, where Q is either the interior or the exterior of a simple smooth closed surface, and Ω and Θ are given functions; the vector v being further required to satisfy certain boundary conditions on the boundary surface S. In the author's terminology, the first boundary value problem corresponds to the conditions: $(v, e_1)=v_1$, $(v, e_2)=v_2$, on S, where v_1 and v_2 are given functions and e_1 and e_2 are unit tangent vectors to the coordinate lines of S; while the second boundary value problem corresponds to the prescription: $(v, n)=w$, on S, where n is the unit outer normal to S, and w is a given function. Explicit formulas for the vector v are given in each case, and also three types of integral equations satisfied by v. These results are based on two lemmas on the representation of an arbitrary vector on $Q+S$, the first one involving the Green's function for the Neumann problem for Q and the Fredholm resolvent for the solution of the Dirichlet problem for Q as a double layer potential, while the second one involves the fundamental solution of the equation $\Delta^2\varphi+\xi^2\varphi=0$, where Δ^2 is the Laplacian, and ξ is an arbitrary constant.

J. B. Diaz.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

An error in the integration theory of motion equations of holonomic and nonholonomic systems. Trudy Inst. mat. i mekh. AN Uz. SSR no.13: 153-167 '54. (MIRA 11:6)

(Differential equations, Partial)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

New motion equations of holonomic systems. Trudy Inst. mat. i mekh. AN Uz. mat. i mekh. AN Uz . SSR no.18:21-34 '54. (MLRA 10:4)
(Differential equations) (Motion)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

AKZHANYKH, I. S.

171. Azhanykh, I. S., Integration of the Gromeko-Lamb equations (in Russian), Trudi Sverdlovsk. un-ta no. 37, 3-14, 1954; Ref. Zh. Mekh. 1956, Rev. 1162.

Examination of the general solutions of equations of motion of an ideal incompressible fluid which are written in the Lamb-Gromeko form. The expression for the vector of the absolute velocity in the Lagrange variables and the general integral for these equations were obtained. An integral equation is given for the vector of the relative velocity, and criteria are established for the existence of an integral for steady vortex motion. A particular case of the general solution in the case of collinearity of the vortex and the velocity is given by Gromeko's solution [I. S. Gromeko, Dissertation Kazan 1881; Collected works, Moscow, Izd-vo AN SSSR, 1952]. The existence of the Gromeko integral is noted for a compressed barotropic fluid. Integral equations of turbulent steady motion of a fluid are given for the case of a parallelism of the vortex of absolute velocity with the vector of the relative velocity.

The integral equations for potential flow about many bodies are examined. The hydrodynamic force is expressed by the solution of the system of integral equations which determines the flow potential.

I. E. Tarapov, USSR

Courtesy Referativnyi Zhurnal

Translation, courtesy Ministry of Supply, England

1/1

SPH

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

124-1957-2-1458

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 2, p 4 (USSR)

AUTHOR: Arzhanykh, I. S.

TITLE: On the Vortex Motion of a Material Point (O vikhrevykh dvizheniyakh material'noy tochki)

PERIODICAL: Tr. Sredneaz. un-ta, 1954, Nr 37, pp 15-19

ABSTRACT: The equation of motion of a material point is formally written in the form of Gromeka-Lamb's hydrodynamic equation:

$$d\underline{v}/dt + \mathrm{rot}\ \underline{v} \times \underline{v} + \nabla 1/2\, v^2 = \underline{F}$$

It is shown that, with certain assumptions on the character of the external force $\underline{F}$, the vector $\underline{v}$ satisfies a certain integral equation.

N.N.Moiseyev

1. Mathematics--Theory

Card 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Functions of the stress tensor in dynamics. Trudy SAGU no.37:163-172 '54 [i.e. '53] (MLRA 10:3)
(Calculus of tensors) (Dynamics)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

"Some Questions in the Integration of Differential Equations of Hydrodynamics" TB Sredneaziat,Un-Ta, No 54, 1954, 75-97

The author represents the equations of hydrodynamics as a fourdimensional divergence of a square matrix of the fourth order. For the case of steady state motion of an ideal incompressible liquid in a plane he reduces the problem of determining vortex motions with the new energy integral to two equations with a partial derivatives for two functions. He constructs the Cauchy formula for the vortex of the vector of absolute velocity in a relative Lagarange coordinates. (RZhMekh, No. 9, 1955)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

USSR

62

Arzhanyh, I. S. Representation of a displacement vector by retarded potentials. Doklady Akad. Nauk SSSR (N.S.) 94, 393–396 (1954). (Russian)

The system of equations governing the dynamics of a three-dimensional elastic body is

$$(*) \qquad \Delta_v' u = f,$$

where the differential operator is Lamé's operator:

$$\Delta_v' = \alpha \operatorname{grad}_v \operatorname{div}_v - \beta \operatorname{rot}_v \operatorname{rot}_v - \frac{\partial^2}{\partial t^2}.$$

(OVER)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

The boundary-value problem of the first kind requires a solution of (*), the values $\mathbf{u}_s$ of the vector $\mathbf{u}$ being prescribed on the boundary surface S, while in the second boundary-value problem the values of

$$d_s\mathbf{u} = \lim_{v \to s} \{c(\mathbf{n}\nabla_v)\mathbf{u} + (\alpha - c)\mathbf{n}\,\mathrm{div}_v\,\mathbf{u} - (\beta - c)[\mathbf{n}\,\mathrm{rot}_v\,\mathbf{u}]\}$$

are prescribed on the boundary. There exists a great analogy between the theory of the system (*) and that of the wave equation in three dimensions. A significant role in the theory of the wave equation is played by Kirchhoff's formula. The author now develops a formula for the Lamé operator which may be said to be of Kirchhoff's type in that it expresses an arbitrary vector $\mathbf{u}$ in terms of its "retarded" values of $\Delta_v^t\mathbf{u}$, $d_s\mathbf{u}$ and $\mathbf{u}_s$. The analysis leads to the consideration of retarded vector potentials which appear as natural generalizations of the customary retarded potentials occurring in the theory of the wave equation. *J. B. Diaz*

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

USSR

Arżanyh, I. S. On the application of functions of a complex variable to the dynamics of a material point. Dokl. Akad. Nauk SSSR (N.S.) 96, 21–24 (1954). (Russian)

This paper presents several theorems on existence of integrals of dynamical systems. The theorems and their proofs remain incomprehensible to the reviewer. The first theorem states: "The system of differential equations $\ddot{x}=U_x+2\omega\dot{y}$, $\ddot{y}=U_y-2\omega\dot{x}$ has always a linear integral (1) $S\dot{x}+T\dot{y}=K$." The context makes clear that S, T, K are to be functions of (x, y) and that the energy constant is to be assumed fixed. The condition that (1) holds on solution curves then leads to a complicated non-linear first-order partial differential equation for K and to the Cauchy-Riemann equations for S, T. At this point, the proof stops. If $S+iT$ is indeed analytic and K can be found from its equation, then one has at best an invariant relation and not an integral. The second and third theorem contain similar assertions and proofs concerning integrals quadratic in $\dot{x}$, $\dot{y}$.

W. Kaplan (Ann Arbor, Mich.).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Arzhanykh, I. S.

38. Arzhanikh, I. S., On the equations of rotation of a heavy rigid body around a fixed point (in Russian), *Doklady Akad. Nauk SSSR (N.S.)* 97, 3, 403–406, July 1954.

Author shows that the motion of a heavy rigid body about a fixed point O can be interpreted (1) by the motion of a particle on the ellipsoid of inertia of this body at O, the motion taking place under the action of certain potential and gyroscopic forces, and (2) by the motion of an electrified particle under the action of a plane electric field and a perpendicular magnetic field. In this last case the motion takes place in a plane. Making use of these two interpretations and of the results of an earlier paper [AMR 8, Rev. 1895], author claims to have shown the existence of a new linear integral different from the integral of angular momentum about the vertical through O. — Dr. Leimanis, Canada

Cent. Asian. State Univ. im V. I. Lenin.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

1-FW

4

Arzanyh, I. S. Regular integral equations of the dynamics of an elastic body. Akad. Nauk Uzbek. SSR. Trudy Inst. Mat. Meh. 15 (1955), 79–85. (Russian)

Consider an isotropic three-dimensional elastic body with density ρ and Lamé's constants λ and μ, which occupies an open bounded set Q whose boundary is a smooth surface S. Its displacement vector $v(q, t)$ satisfies the equation

$$\alpha \operatorname{grad} \operatorname{div} v - \beta \operatorname{rot} \operatorname{rot} v - \frac{\partial^2 v}{\partial t^2} = f,$$

in Q, where $\alpha = (\lambda + 2\mu)/\rho$, $\beta = \mu/\rho$; assigned initial conditions on $v(q, 0)$, $\partial v(q, 0)/\partial t$; and boundary conditions of one of two kinds: $v(s, t)$ assigned on S, or

$$2\mu \frac{\partial v}{\partial n} + \lambda n \operatorname{div} v + \mu n \times \operatorname{rot} v + hv$$

assigned on S, where h is a given scalar function on S. The author constructs, in both cases, regular integral equations satisfied by the Laplace transform

$$u(q, \eta) = \int_0^\infty e^{-\eta t} v(q, t)\, dt,$$

employing the method outlined in a previous paper [Dokl. Akad. Nauk SSSR (N.S.) 81 (1951), 513–516; MR 14, 220].

J. B. Diaz (College Park, Md.).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I.S.

Extension of the potential method of integration to canonical involute systems with explicit differentials. Trudy Inst.mat.i mekh. AN Uz.SSR no.15:87-91 '55. (MLRA 9:5)
(Integrals) (Involutes(Mathematics))

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

124-1957-10-11929

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 10, p 105 (USSR)

AUTHOR: Arzhanykh, I. S.

TITLE: The Lag Potentials of the Dynamics of Elastic Bodies (Zapazdyvayushchiye potentsialy dinamiki uprugogo tela)

PERIODICAL: Tr. In-ta matem. i mekhan. AN UzSSR, 1955, Nr 16, pp 5-22

ABSTRACT: Detailed account of the results of the Author's work on the construction and investigation of the main dynamic potentials in isotropic elastic theory. A formula is proposed for Lamé's dynamic operator, similar to the Kirchhoff formula, with lag potential for the wave operator. The properties of the potentials introduced, such as the volumetric, the surface-force, and the surface-deformation potential, are investigated; basically they are similar to the known properties of the volumetric potentials in single and double strata. The general boundary problem of elastic-body dynamics is reduced to linear integral-differential equations which, in particular cases, yield the well-known integral equations of the Dirichler and Neumann problems of statics and of stationary vibrations in elastic bodies.

Card 1/1

V. D. Kupradze

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Arzanyh, I. S. On the method of characteristics for simultaneous partial differential equations of the first order. Akad. Nauk Uzbek. SSR. Trudy Inst. Mat. Meh. 16 (1955), 23-27. (Russian)

Verfasser behandelt Systeme der Art

$$F_\rho(x_1, \cdots, x_n, p_1, \cdots, p_n) = 0 \quad (\rho = 1, 2, \cdots, r),$$

worin p_ν die ersten Ableitungen der unbekannten Funktion u bedeuten ($\nu = 1, 2, \cdots, n$). Das System wird durch die Klammerbedingungen

$$(F_\rho, F_\sigma) = 0 \quad (\rho, \sigma = 1, 2, \cdots, r)$$

ergänzt. Im Sinne des Cauchyschen Problems wird die Anfangsmannigfaltigkeit

$$X_\nu = \varphi_\nu^{(0)}(s_1, \cdots, s_{n-r}), \quad u = \psi^{(0)}(s_1, \cdots, s_{n-r})$$

vorgeschrieben. Die Lösungen der Differentialgleichungen

$$(*) \quad dx_\nu = \sum_\rho \frac{\partial F_\rho}{\partial p_\nu} dt_\rho, \quad dp_\nu = -\sum_\rho \frac{\partial F_\rho}{\partial x_\nu} dt_\rho, \quad du = \sum_{\rho,\nu} \frac{\partial F_\rho}{\partial p_\nu} p_\nu dt_\rho$$

heiszen charakteristische Mannigfaltigkeiten. Im Sinne des Cauchyschen Problems fallen die charakteristischen Fortschreitungsrichtungen $dt_1 : dt_2 : \cdots : dt_p : \cdots : dt_r$ mit keiner der Tangentialrichtungen auf der vorgegebenen Anfangsmannigfaltigkeit zusammen. Das charakteristische

Mett

1-F\W

2

YN

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

System ist vollständig integrabel, die Funktionen F_ρ sind Integrale des charakteristischen Systems. Unter diesen Voraussetzungen beweist Verfasser die Lösbarkeit des Cauchyschen Anfangswertproblems und behandelt die Beispiele

$$p_1^2+(x_1-x_2)p_3=0,\quad p_1+p_2=0$$

mit den Anfangsbedingungen

$$x_1=s_1,\quad x_2=-s_1,\quad x_3=0,\quad u=s_1$$

und

$$p_1p_2=x_1x_2,\quad p_3p_4=x_3x_4$$

mit den Anfangsbedingungen

$$x_1=x_2,\quad x_3=x_4,\quad u=x_1^2+x_3^2.$$

Schließlich wird auch der Fall untersucht, daß die unbekannte Funktion u explizit im vorgelegten Differentialsystem auftritt. *M. Pinl* (Köln).

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

89544

S/044/60/000/008/016/035
C111/C222

16.3500

AUTHOR: Arshanykh, I.S.

TITLE: On the method of characteristics for systems of partial differential equations of first order

PERIODICAL: Referativnyy zhurnal. Matematika, no.8, 1960, 96, abstract no.8913. Tr. In-ta matem. i mekhan. AN Uz SSR, 1955, no.16, 23-27

TEXT: The author considers the system of r compatible equations

$$F_\varrho(x_1,\ldots,x_n,p_1,\ldots,p_n) \qquad (\varrho = 1,2,\ldots,r, \quad p_i = \frac{\partial u}{\partial x_i}).$$

The determination of a solution of this system which goes through the hypersurface

$$x_\nu = \varphi_\nu^0(s_1,\ldots,s_{n-r}); \qquad u = \psi^0(s_1,\ldots,s_{n-r})$$

is called a Cauchy problem. In the paper, the characteristic manifold is the manifold defined by the following system of equations in differentials:

Card 1/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

89544

S/044/60/000/008/016/035
C111/C222

On the method of characteristics...

$$dx_v = \sum_{\varsigma} \frac{\partial F_{\varsigma}}{\partial p_v} dt_{\varsigma}, \qquad dP_v = -\sum_{\varsigma} \frac{\partial F_{\varsigma}}{\partial x_v} dt_{\varsigma},$$

$$du = \sum \sum \frac{dF_{\varsigma}}{\partial p_v} p_v dt_{\varsigma}.$$

The following theorem is proved in the paper: The Cauchy problem is solvable if the characteristic directions do not lie in the tangenting plane of the hyperplane of the initial data.

[Abstractor's note: The above text is a full translation of the original Soviet abstract.]

Card 2/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SOV/124-57-8-9256

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 8, p 98 (USSR)

AUTHOR: Arzhanykh, I. S., Bondarenko, B. A.

TITLE: On the Expression of the General Static Solutions of the Theory of Elasticity by Means of Definite Integrals (O predstavlenii obshchikh resheniy statiki teorii uprugosti opredelennymi integralami)

PERIODICAL: Tr. In-ta matem. i mekhan. AN UzSSR, 1955, Nr 16, pp 34-38

ABSTRACT: The harmonic functions contained in the expressions of the general solutions of the elasticity-theory equations in P. F. Papkovich's form, supplemented by the component rot r x H, are expressed in the integral form of Whittaker

$$G_x = \int_{-\pi}^{\pi} g_x (x \cos \phi + y \sin \phi + iz, \phi)\, d\phi$$

etc.

The paper provides the expressions of deflections and stresses in terms of six arbitrary functions.

Card 1/1

A. I. Lur'ye

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, A. S.

USSR/ Physics - Lagging potentials

Card 1/1 Pub. 22 - 5/47

Authors : Arzhanykh, A. S.

Title : Presentation of an electromagnetic field through lagging potentials

Periodical : Dok. AN SSSR, 100/6, 1053-1057 Feb 21, 1955

Abstract : A series of lemmas and theorems are proved for the purpose of showing some advantages in using the lagging potentials for presentation of an electro-magnetic field. Boundary problems and equations of electron gas are considered. Three USSR references (1946-1952).

Institution : Academy of Sciences Uzb. SSR, the V. I. Romanovskiy Institute of Mathematics and Mechanics

Presented by: Academician N. N. Bogolyubov, December 8, 1954

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, I. S.

Aržanyh, I. S. On a connection of a bi-wave field with the dynamical theory of elasticity. Dokl. Akad. Nauk SSSR (N.S.) 104 (1955), 520-523. (Russian)

The author shows that there is a direct connection between the integration of the bi-wave equation

$$(*)\qquad \left(\nabla^2-\frac{1}{\alpha}\frac{\partial^2}{\partial t^2}\right)\left(\nabla^2-\frac{1}{\beta}\frac{\partial^2}{\partial t^2}\right)\varphi=f(x_1, x_2, x_3, t),$$

and the integration of the dynamical equations of three-dimensional elasticity

$$(**)\quad \alpha \operatorname{grad}\operatorname{div} u-\beta \operatorname{rot}\operatorname{rot} u-\frac{\partial^2 u}{\partial t^2}=F(x_1, x_2, x_3, t);$$

and also between the Laplace transform of the equation

$$\prod_{1=1}^{2}\left(\nabla^2-k_i^2-\frac{1}{c_i^2}\frac{\partial^2}{\partial t^2}\right)\varphi=f,$$

$k_i=2\pi m_i c_i/h$, where h is Planck's constant, and that of the Laplace transform

$$\alpha \operatorname{grad}\operatorname{div} v-\beta \operatorname{rot}\operatorname{rot} v-\eta^2 v=G(x_1, x_2, x_3, \eta),$$

of (**). The properties of the potentials of simple and double layers corresponding to equation (*) are investigated. *J. B. Diaz* (College Park, Md.).

1 - F/W

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Arzhanykh, I. S.

Call Nr: AF 1108825

Transactions of the Third All-union Mathematical Congress, Moscow, Jun-Jul '56, Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.

There are 2 references, both of them USSR.

Shirshov, A. I. (Moscow). One Some Non-associative Nil-rings in Algebraic Algebras. 40

There are 3 references, 1 of whihh is USSR, and 2 are English.

Yaglom, I. M. (Moscow). On Some Algebraic Characteristics of Real Simplectic Spaces. 40-41

Section of Differential and Integral Equations. 42-73

Reports of the following personalities are included:

Aleksandryan, R. A. (Yerevan). Qualitative Properties of Solutions of Some Mixed Problem and Spectral Eigenfunctional Expansion. 42

Arzhanykh, I. S. (Tashkent). Field Method of the Theory of Mathematical Physics Differential Equation Hyperbolic System. 42

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Name: ARZHANYKH, Ivan Semenovich

Dissertation: Integral equations of basic problems of the field theory and theory of elasticity

Degree: Doc Phys-Math Sci

Affiliation: Central Asiatic State U imeni Lenin

Defense Date, Place: 21 Jun 56, Council of Moscow Order of Lenin and Order of Labor Red Banner State U imeni Lomonosov

Certification Date: 16 Nov 57

Source: BMVO 24/57

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

124-1957-2-1457

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 2, p 4 (USSR)

AUTHOR: Arzhanykh, I. S.

TITLE: On the Integration of the Equations of Motion of Non-holonomic Systems of Class T (2, 1) [Ob integrirovanii uravneniy dvizheniya negolonomnykh sistem klassa T (2, 1)] Summary in Uzbek

PERIODICAL: Dokl. AN UzSSR, 1956, Nr 3, pp 3-6

ABSTRACT: Upon introduction of a non-holonomic parameter the Author indicates the possibility of the integration by means of quadratures of the equation of motion for S.A.Chaplygin's stationary non-holonomic systems having two degrees of freedom. The basic requirement is that only one Lagrange coordinate should enter into the kinetic and potential energies, as well as into the equations of constraint.

V.S.Novoselov

1. Mathematics--Theory

Card 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

ARZHANYKH, K.S.

Ignoring cyclic coordinates in dynamic systems of a rank greater than zero. Dokl. AN Uz. SSR no.7:3-7 '56. (MIRA 12:6)

1. Institut matematiki i mekhaniki AN UzSSR im. V.I. Romanovskogo. Predstavlene akad. AN UzSSR Kh. A. Rakhmatullinym.
(Coordinates)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

~~ARZHANYKH, Y.S.~~ ARZHANYKH, J.S.

SUBJECT USSR/MATHEMATICS/Geometry CARD 1/2 PG - 656
AUTHOR ARZHANYCH J.S.
TITLE The universal meaning of the contact transformation.
PERIODICAL Uspechi mat.Nauk 11, 1, 167-172 (1956)
reviewed 3/1957

The author considers the general Pfaff system $\sum_{\lambda=1}^{m+s} X_{\lambda\mu}(x_1,\ldots,x_{m+s})dx_\lambda = 0$ $(\mu=1,\ldots,n)$ which is proved to be equivalent to

$$(1)\quad dq_\nu = \sum_{\sigma=1}^{s}\left(\frac{\partial H_\sigma}{\partial p_\nu} + \sum_{i=1}^{r} F_{i\sigma}\frac{\partial H_{i\sigma}}{\partial p_\nu}\right)dt_\sigma, \quad -dp = \sum_{\sigma=1}^{s}\left(\frac{\partial H_\sigma}{\partial q_\nu} + \sum_{i=1}^{r} F_i \frac{\partial H_{i\sigma}}{\partial q_\nu}\right)dt_\sigma$$

$(\nu=1,\ldots,n)$.

By the contact transformation $p = \frac{\partial w}{\partial q} + \Lambda_k \frac{\partial w_k}{\partial q}$, $-\eta = \frac{\partial w}{\partial \xi} + \Lambda_k \frac{\partial w}{\partial \xi}$ (shortened writing of vectors and sums), (1) is transferred to the form

$$(2)\quad d\xi = \left(\frac{\partial K_\sigma}{\partial \eta} + F_{i\sigma}\frac{\partial K_{i\sigma}}{\partial \eta}\right)dt_\sigma, \quad -d\eta = \left(\frac{\partial K_\sigma}{\partial \xi} + F_{i\sigma}\frac{\partial K_{i\sigma}}{\partial \xi}\right)dt_\sigma.$$

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

Uspechi mat.Nauk: 11, 1, 167-172 (1956) CARD 2/2 PG - 656

Here the author puts $K_\sigma = H_\sigma + \frac{\partial w}{\partial t_\sigma} + \Lambda_k \frac{\partial w_k}{\partial t_\sigma}$, $K_{i\sigma} = H_{i\sigma}$ and the multipliers Λ_k are determined from the finite equations $w_K(t_1,\ldots,t_s;g,\xi)=0$ $(K=1,\ldots,k)$. The connection between (1) and (2) can also be erected by the following system of contact transformations:

$$q = u - \frac{\partial\phi}{\partial v} - M_\lambda \frac{\partial\phi_\lambda}{\partial v}, \qquad p = v + \frac{\partial\phi}{\partial u} + M_\lambda \frac{\partial\phi_\lambda}{\partial u}$$

$$\xi = u + \frac{\partial\phi}{\partial v} + M_\lambda \frac{\partial\phi_\lambda}{\partial v}, \qquad \eta = v - \frac{\partial\phi}{\partial u} - M_\lambda \frac{\partial\phi_\lambda}{\partial u}.$$

Here $\phi = \phi(t_1,\ldots,t_s;u,v)$ and the multipliers M_λ are determined from the equations $\phi_\lambda(t_1,\ldots,t_s;u,v) = 0$ $(\lambda=1,\ldots,l)$. In these very general connections e.g. the well-known Jacobian treatment of the differential equations of mechanics by contact transformations is contained as a special case.

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SOV/124-57-7-8191

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 7, p 113 (USSR)

AUTHOR: Arzhanykh, I.S.

TITLE: On Some New Aspects of the Structure of Displacement Vectors in Dynamic Problems of the Theory of Elasticity (O nekotorykh novykh voprosakh struktury vektora smeshcheniya dinamicheskikh zadach teorii uprugosti)

PERIODICAL: Tr. In-ta matem. i mekhan. AN UzSSR 1956, Nr 17, pp 87-116

ABSTRACT: The results of previous investigations are given (see RZhMekh, 1953, abstract 1299; 1954, abstract 4188; 1955 abstract 2029). A displacement vector is determined which fulfills the requirements of the dynamic equation of Lamé with respect to the divergence, the vorticity and the prescribed boundary conditions, namely, the displacement vector on the surface of a body and its total normal derivative. The structural formulas for the displacement vector are obtained. A study is made of the integral-differential and integral equations determining the unknown quantities entering into the structural expressions of the displacement vector. The solution of these equations is not given. Bibliography: 6 references. N. A. Kil'chevskiy

Card 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

83508

S/124/60/000/006/001/039
A005/A001

16.7300

Translation from: Referativnyy zhurnal, Mekhanika, 1960, No. 6, p. 5, # 6833

AUTHOR: Arzhanykh, I.S.

TITLE: The Integral Formulation of a Dynamic Field Vector

PERIODICAL: Tr. in-ta matem. i mekhan. AN UzSSR, 1956, No. 18, pp. 3-19

TEXT: The vector $\mathbf{v}(q,t)$ depending on the coordinates q_1, q_2, q_3 of the point q and time t is considered within the region Q + S where S is the boundary surface; the vector $\mathbf{v}$ satisfies the equation system

$$\mathrm{rot}\,\mathbf{v} = \Omega \quad , \quad \mathrm{div}\,\mathbf{v} = \theta \qquad (1)$$

where the vector Ω and the scalar θ may be either specifically prescribed in Q+S or expressed through the vector $\mathbf{v}$. The theorem is verified. The theorem: If the vector $\mathbf{v}$ should satisfy the equation (1), it is necessary that it would have the following structure:

$$4\pi\,\mathbf{v}(p,t) = \frac{1}{a^2}\int \frac{1}{r(p,q)}\,\frac{\partial^2 \mathbf{v}(q,t)}{\partial t^2}\,dQ + \mathrm{grad}\,\Phi - \mathrm{rot}\,\Psi\,, \qquad (2)$$

Card 1/3

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

83508
S/124/60/000/006/001/039
A005/A001

The Integral Formulation of a Dynamic Field Vector

where the scalar Φ and the vector Ψ have the values

$$\Phi(p,t) = \int \frac{\mathbf{n}(s)\cdot\mathbf{v}(s,t)}{r(p,s)}\,dS - \int \frac{\theta(q,t)}{r(p,q)}\,dQ$$

$$\Psi(p,t) = \int \frac{\mathbf{n}(s)\times\mathbf{v}(s,t)}{r(p,s)}\,dS - \int \frac{\Omega(q,t)}{r(p,q)}\,dQ$$

4

($r(p,q)$ is the distance between two points, $\mathbf{n}(s)$ is the normal to S, and a = const is the velocity of the propagation process connected with Eq. (1)), and it is sufficient that it satisfies, having the structure (2), the initial conditions

$$\operatorname{div}\mathbf{v} - \theta = 0, \qquad \frac{\partial}{\partial t}(\operatorname{div}\mathbf{v} - \theta) = 0$$

$$\operatorname{rot}\mathbf{v} - \Omega = 0, \qquad \frac{\partial}{\partial t}(\operatorname{rot}\mathbf{v} - \Omega) = 0.$$

Further, the displacement vector $\mathbf{v}$ of the elastic medium is considered, which satisfies the equation

$$\frac{\partial^2\mathbf{v}}{\partial t^2} = \frac{\lambda + 2\mu}{\rho}\operatorname{grad}\theta - \frac{\mu}{\rho}\operatorname{rot}\Omega - \mathbf{f}$$

Card 2/3

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

83508
S/124/60/000/006/001/039
A005/A001

The Integral Formulation of a Dynamic Field Vector

where λ, μ are the Lamé constants, ρ is the density, $\mathbf{f}$ is the vector of the mass force. Basing on the formula (2), an integral correlation is derived, which expresses θ (in the present case θ represents the volume dilatation) and Ω at an arbitrary point of the region Q + S through the boundary values of θ, Ω, and $\mathbf{v}$, which are given on the surface S. For determining the boundary values of θ and Ω, integral-differential equations are established. Analogous integral formulations and integral-differential equations are derived for the vectors of electromagnetic field intensity, which satisfy the Maxwellian equations, and also for the vectors of electromagnetic field intensity, which arises when an electron gas moves.

G.N. Pykhteyev

Translator's note: This is the full translation of the original Russian abstract.

Card 3/3

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SOV/124-57-7-7498

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 7, p 6 (USSR)

AUTHOR: Arzhanykh, I. S.

TITLE: New Equations for the Motion of Holonomic Systems (Novyye uravneniya dvizheniya golonomnykh sistem)

PERIODICAL: Tr. In-ta matem. i mekhan. AN UzSSR, 1956, Nr 18, pp 21-34

ABSTRACT: For the case of a holonomic system containing the determining coordinates $q_1, \ldots, q_n$ and characterized by the relationships

$$\phi_\mu (t, q_1, \ldots q_n) = 0 \qquad (\mu = 1, \ldots, m)$$

Lagrange's equations of motion containing multipliers of these relationships are first transformed into Lagrange equations without such multipliers, then into canonical equations. Two examples are adduced to illustrate the use of this method.

M. I. Yefimov

Card 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9

SOV/124-58-4-4383

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 4, p 98 (USSR)

AUTHORS: Arzhanykh, I. S., Bondarenko, B. A.

TITLE: On the Differential Equations for the Stress Functions of an Anisotropic Elastic Substance (O differentsial'nykh uravneniyakh dlya funktsiy napryazheniy anisotropnogo uprugogo tela)

PERIODICAL: Tr. In-ta matem. i mekhan. AN UzSSR, 1956, Nr 18, pp 35-41

ABSTRACT: The authors offer six differential equations of motion for a uniform elastic anisotropic medium containing 15 arbitrary functions, with the help of which it is possible to form various modifications of the differential equations of motion. The components of the displacement vector are expressed by the derivatives of the 15 functions, while six functions are not included at all.

1. Elastomers--Stresses 2. Differential equations
3. Functions

L. N. Ter-Mkrtich'yan

Card 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102320004-9"