Carafoli, E.

Carafoli, E., et Patraulea, N. Mouvement dans un milieu poreux autour des surfaces perméables. Com. Acad. R. P. Romîne 2 (1952), 143–146. (Romanian. Russian and French summaries) 1 - F/W

The authors study the movement of an incompressible fluid past a permeable plate according to the Darcy hypothesis. The penetration conditions through the permeable surface are stated. The authors find that when the intensity of the vortex layer is developed in a Fourier series, an equation is arrived at which is virtually the same as that encountered in the linear theory of wings of finite span [cf. Carafoli, Théories des ailes monoplanes d'envergure finie. An. Acad. Române. Mem. Secţ. Şti. (1945) (unavailable for review)]. By means of a simple transformation the authors determine the movement in the whole plane.

K. Bhagwandin (Oslo).

CARAFOLI, E.

1-F/W

Carafoli, E., et Patraulea, N. L'équation de la circulation autour d'une aile à fuselage central. Com. Acad. R. P. Romîne 2 (1952), 249–255. (Romanian. Russian and French summaries)

The author assumes that the fuselage may be replaced by an infinite cylinder normal to the wing and parallel to the flow at infinity. Far behind the wing the perturbation of uniform flow is essentially plane flow about the fuselage induced by the trailing vortex system. By means of a conformal mapping in planes normal to the fuselage which carries a cross-section of the fuselage onto a slit, the author reduces the problem to that of determining the spanwise distribution of circulation about an image wing without a fuselage but with appropriately modified chord and twist. When this has been found by standard methods, the induced drag and the spanwise lift distribution can easily be computed for the original wing-fuselage combination.

J. Giese (Aberdeen, Md.).

1-F/7

Carafoli, E., et Patraulea, N. Le théorème de la résistance minimum des systèmes portants complexes. Com. Acad. R. P. Romîne 2 (1952), 441–446. (Romanian. Russian and French summaries)

The authors wish to minimize the induced drag of a system of lifting lines with prescribed total lift L in a given direction D and prescribed rolling moment M about a given point O. For a system of wings the local component of induced velocity normal to the wings must arise from a superposition of translation at some velocity w parallel to D and rotation with some angular velcoity ω about O. For a system composed of wings and infinite cylindrical fuselages they propose to solve their problem by superposing two flows obtained as follows. 1) Treat the fuselages as lifting surfaces and find the optimum flow with appropriate w and ω for the entire wing fuselage system. 2) For the fuselage system alone find the flow with induced velocity corresponding to $-w$ and $-\omega$. The reviewer is not convinced by the authors' argument that this superposition will minimize the induced drag.

J. Giese.

CARAFOLI, E.

Carafoli, E. Sur le caractère hydrodynamique des solutions concernant les mouvements coniques appliquées à la théorie des ailes polygonales. Com. Acad. R. P. Romîne 2 (1952), 629–644. (Romanian. Russian and French summaries)

Consider linearized supersonic flow about a cone with vertex at the origin of a rectangular coordinate system with X-axis parallel to the undisturbed flow at Mach number M. Let

$$\xi=\eta+i\zeta=B(Y+iZ)/\{X+[X^2-B^2(Y^2+Z^2)]^{0.5}\}$$

where $B^{-2}=M^2-1$ and let u be the X-component of velocity perturbation. Then $u=\mathrm{Re}\,(u+iu')=\mathrm{Re}\,f(\xi)$ for some analytic function of ξ. The author considers flows about triangular flat-plate wings with one or two subsonic leading edges; with a subsonic trailing edge and either sub- or supersonic leading edge; and about sets of canted fins composed of pairs of such plates placed anti-symmetrically with respect to $\zeta=0$. On various segments of the Mach cone $|\xi|=1$, $u=0$ or some other constant. On segments of the η-axis where the boundary condition for the wing is applied u' is constant. For all six examples discussed $|\xi|=1$ and the cone can be mapped on the real and imaginary axes of a new complex plane by elementary transformations. By interpreting u' as a stream function of an incompressible flow, constant on certain straight segments, and by taking into account the nature of singularities required at leading edges, etc., the author is able to find $f(\xi)$ explicitly in terms of elementary functions by superposing vortex and doublet potentials, etc.

J. Giese (Aberdeen, Md.)

CARAFOLI, E

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Carafoli, E., et Horovitz, B. L'écoulement supersonique autour d'une aile triangulaire à disques marginaux. Com. Acad. R. P. Române 3 (1953), 395–404. (Romanian. Russian and French summaries) | 1 - F/W

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Carafoli, E. and Horovitz, B.
Supersonic flow around a triangular wing
with marginal discs.
Source: Com. Acad. R. P. Romane 3 (1953),
395-404. (Rumanian. Russian and French summaries)

RDW

Carafoli, E.

Rezistenţa Aripilor Triunghiulare Dublu-conice, cu Pantă Variabilă, în Curent Supersonic (Trainée d'Ailes Triangulaires Coniques à Pente Variable, en Régime Supersonique). E. Carafoli, and M. Ionescu. *Rumania, Acad. Rumanian People's Rep., Inst. Appl. Mech., Studies & Res. in Appl. Mech.*, July-Dec., 1954, pp. 285-305. In Rumanian. Study of the wake problem for doubly conical, triangular wings of symmetrical thickness in supersonic flow.

A G

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CARAFOLI, Elie

CARAFOLI E

Carafoli, Elie. De la portance et de la résistance de l'aile triangulaire aux vitesses supersoniques. [illegible]

Acc

1/2

Let D be a closed curve in the plane $x=1$ which includes a segment of the plane $y=0$ and is symmetrical about $z=0$. Through D pass two cones, the first with vertex at the origin, the second with vertex $(h, 0, 0)$ where $0<h<1$. Now construct a thick wing of triangular plan form whose lower surface lies in $y=0$; the front part of its upper surface is on the first cone; and the rear surface's y-coordinates are the difference between those of both cones. Then construct a wing completely bounded by curved surfaces by fitting together two wings of the sort just described with the triangular plan forms. Flow over

CARAfoli, Elie

the front surface can be obtained from the thickness distribution as in the preceding paper. The author conjectures that over the rear surfaces, to the accuracy of [illegible] flow the perturbation imposed [illegible] [illegible] ally the opposite of the [illegible] over the second [illegible] velocity. Thus the [illegible] found from similar integr[illegible] Under these assumptions [illegible] the drag and lift of the [illegible] that he has taken [illegible] of the rear surfaces [illegible]

36 [illegible]

Carafoli, Elie

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Carafoli, Elie, et Horovitz, Beatrice. L'influence des disques axiaux sur l'écoulement supersonique autour des ailes angulaires coniques, à épaisseur et incidence variables. Com. Acad. R. P. Romîne 4, 271–283 (1954) (Romanian. Russian and French summaries)

1 - F/W

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CARAFOLI, E. ; ORVEANU, T.

CARAFOLI, E. ; ORVEANU, T. Mecanicalfluidelor (Fluid Mechanics): a book review p. 31

Vol. 1, no. 11 Nov.1955
ARIPILE PATRIEI
TECHNOLOGY
Bucuresti, Rumania

So: Eastern European Accession Vol. 5 No. 4 April 1956

CARAFOLI, E.;
CARAFILI, A.; DUMITRESCU, L.

Biconic narrow delta wings with variable incidence in supersonic currents. p. 237. Academia Republicii Populare Romine. Institutul de Mecanica Aplicata. STUDII SI CERCETARI DE MECANICA APLICATA. Bucuresti. Vol. 6, no. 3/4, July/Dec. 1955.

So. East European Accessions List Vol. 5, No. 9 September, 1956

CARAFOLI, E.

Scientific research for improvement of the material base in the field of machine construction.

p. 93
Suppl. to v. 3, 1955
ANALELE
Bucuresti

SO: Monthly List of East European Accessions (EEAL), LC, Vol. 5, no. 12
December 1956

CARAFOLI, ELIE

Book—2995. Carafoli, E., High-speed aerodynamics (compressible flow), Bucharest, Editura Tehnica, 1956, 710 pp. + 2 graphs.

Translation (evidently by author) from Roumanian of "Aerodinamica Vitezelor Mari" [Editura Academiei R.P.R., Bucharest, 1956]. Scope is indicated by abbreviated chapter headings, followed by number of pages in parentheses; asterisk implies linearized or small disturbance theory: 1. Vector analysis (16); 2. Thermodynamics (24); 3. Equation of flow (20); 4. Propagation (12); 5. Forms of equations (11); 6. Steady flow through pipes and nozzles (11); 7. Plane shock waves (24); 8. Applications of one-dimensional flow (28); 9. Subsonic flow* (21); 10. Influence of compressibility upon wing of finite span* (33); 11. Subsonic two-dimensional flow, great variations in velocity (25); 12. Correspondence formula, flow with circulation (18); 13. Transonic regime (25); 14. Two-dimensional supersonic flow* (19); 15. Body of revolution* (23); 16. Conical flow* (17); 17. Expansion of two-dimensional supersonic stream (27); 18. Supersonic profiles in second approximation (21); 19. Method of characteristics, two-dimensions (31); 20. Application of characteristics to plane effusors, diffusors and jets (20); 21. Circular cone (14); 22. Characteristics in axially symmetric flow, bodies of revolution and effusors (19); 23. Methods for supersonic wings of finite span* (16); 24. Conical flow* (21); 25 and 26. Angular wings of symmetrical thickness* (44); 27. Plane triangular wing* (23); 28. Thin plane wings of

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CARAFOLI, E.

...sual shape* (26); 29. Thin wings with variable angle of attack* (12); 30. Polygonal wings with flat plates normal to the wing* (27); 31. Conical flows of higher order* (30); 32. Unsteady flow* (24).

Despite great length (710 pp., 50 lines/p., 80 units/line), coverage must be regarded as incomplete in important respects; e.g., there are 193 pp. on conical wing theory but no mention of Evvard's method and only passing reference to slender wing/body theory; no reference to transonic work of Cole, Guderley, Vincenti, or Yoshihara; no treatment of hypersonic flow. Treatment of unsteady flow closely approximates (albeit with reference) that of Temple ["Modern developments in fluid dynamics - high speed flow," Oxford Univ. Press, 1953, chap. IX]. Length, uneven coverage, mediocre English, absence of exercises, and—most importantly—absence of any index, renders book unsuitable as text. Practicians and research workers may find detailed treatment of particular problems valuable, but reviewer believes specialized monographs (such as in "Cambridge monographs on mechanics and applied mathematics") more efficient for this purpose.

J. W. Miles, USA

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RHA

CARAFOLI, E.

Asupra Aripii Unghiulare Avînd Discuri Axiale cu Incidență Antisimetrică. E. Carafoli and Beatrice Horovitz. *Stud. Cerc. Mec. Aplic.*, Apr.-June, 1956, pp. 307-321. In Rumanian. Determination of the expression $f = u + iu'$, where u is the component of the perturbation velocity in the case of an angular wing having a disc of antisymmetric incidence.

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CARAFOLI, E.

REZISTENTA DE UNDA A UNEI CLASE DE ARIPI DELTA SUBTIRI DUBLU-CONICE, CU INCIDENTA VARIABILA, IN CURENT SUPERSONIC. E. Carafoli and L. Dumitrescu. Stud. Cerc. Mec. Aplic., July-Sept., 1956, pp. 581-598. In Rumanian. Investigation of drag on thin, doubly conical, delta wings with variable incidence in supersonic flow. Includes calculation of the drag coefficient C_{xA} for the cases of a supersonic and a subsonic leading edge. Results indicate that the incidence near the leading edge has a considerable influence on the aerodynamic characteristics of the wing.

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CARAFOLI, E.

Influenta Bracajului Aripioarelor Asupra Caracteristicilor Aerodinamice Ale Aripii Triunghiulare in Regim Supersonic. E. Carafoli and S. Sandulescu. *Stud. Cerc. Mec. Aplic.*, Oct.-Dec., 1950, pp. 81-340. In Rumanian. Study of the influence of aileron leveling on the aerodynamic characteristics of triangular wings in the supersonic regime, within the limits of the theory of conical motions. Two cases are considered: ailerons with supersonic leading edge and ailerons with subsonic leading edge. The static axial velocity is determined, and the hydrodynamic analogy method is used to derive the general relations for the coefficient of lift, pitching moment, and hinge moment.

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RHA

3393. Carafoli, E., and Horovitz, Beatrice, On the singular wing fitted with axial plates having antisymmetrical incidence (In Roumanian), *Studii si cercetari Mecan. appl.* 7, 2, p. 397, 1956.

Proceeding from Buseman's transformation, an holomorphic function $f = u + iv$, is determined, where u is the component in the stream direction of the disturbance velocity, which is then used in order to deduce the pressure coefficient. Considering that the disk has constant but different incidences on the portions situated under or above the wing, the conditions which should be accomplished by the components of the total disturbance velocity are written in the case of thin or symmetrical thick wings.

The results are first applied to the rectangular wing fitted with marginal disks, for which the lift, drag, and rolling moment are calculated, and then to the cruciform wing with antisymmetrical incidence and included with the Mach cone, for which the rolling moment is determined.

The final formulas are simple and allow the numerical calculations for various elements, i.e., airplane and rocket tails and so on, to be readily effectuated.

N. Tipei, Roumania

Homogeneous Supersonic Flow Around an Angular Wing

3

1-FW

1/ Carafoli, Elie; and Horovitz, Béatrice. L'écoulement supersonique homogène, d'ordre supérieur, autour d'une aile angulaire à plaque normale. Acad. R. P. Romîne. Stud. Cerc. Mec. Apl. 8 (1957), 959–974. (Romanian. Russian and French summaries)

Consider a body composed approximately of two sectors of the x_1x_2 and x_1x_3 planes, with common vertices at the origin. To find the linearized supersonic flow about it parallel to the x_1-axis with velocity distributions on wing and plate of a type described below, the author seeks a velocity potential $\Phi(x_1, x_2, x_3)$ that is homogeneous of order n in x_1, x_2, x_3. By Euler's formula the velocity components $u=\Phi_{100}$, $v=\Phi_{010}$, $w=\Phi_{001}$ are expressible as linear combination of $\Phi_{p,q,r}=\partial^n\Phi/\partial x_1^p\partial x_2^q\partial x_3^r$, $p+q+r=n$, with coefficients that are known functions of x_1, $y=x_2/x_1$, and $z=x_3/x_1$. On the wing, approximately in the x_1x_3 plane, for example, $(n-1)!w/x_1^{n-1}=\sum_0^{n-1} C_{n-1}^q z^q \Phi_{n-q-1,q,1}$ where C_{n-1}^q is a binomial coef-

Carafoli, Elie; and Horovitz, Béatrice

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ficient. To obtain normal velocity distributions of the type $w=\Sigma_0^{n-1} w_{n-q-1,q} x_1^{n-q} x_2^q$ on the wing, impose the boundary conditions $C_{n-1}^q \Phi_{n-q-1,q,1}=(n-1)! w_{n-q-1,q}$. Also, impose a homogeneous polynomial distribution of normal velocity on the plate in the x_1x_2-plane. As in conical flow, $\Phi_{p,q,r}$ are harmonic functions of certain distorted coordinates η, ζ in the yz-plane. Let $\Phi_{p,q,r}'$ be the conjugate harmonic functions, and let $F_{p,q,r}(\xi)=\Phi_{p,q,r}+i\Phi_{p,q,r}'$, where $\xi=\eta+i\zeta$. By virtue of certain compatibility relations among $F_{p,q,r}$, it suffices to find only $F_{n,0,0}$, for which $\Phi_{n,0,0}=0$ on $|\xi|=1$ and $\Phi_{n,0,0}'=0$ on the segments of the real and imaginary axes that correspond to wing and plate. By considering the nature of the singularities expected at the leading edges of wing and plate, the author is able to determine $F_{n,0,0}$ explicitly.

J. H. Giese (Aberdeen, Md.)

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CARAFOLI E.

3030. Carafoli, E., and Ionescu, M., General theory of triangular wing with given pressure distribution (in French), *Acad. Repub. Pop. Romine, Rev. Mecan. Appl.* 3, 2, 5–21, 1958.

Authors discuss the so-called reverse problem which consists in determining the surface form (the warp) of a triangular wing in supersonic flow, the pressure coefficient distribution being given under the form of a higher-order homogeneous polynomial. The cases which define the problem are then presented, pointing out that each of these cases may be reduced to a direct equivalent problem. It follows that the reverse problem may be treated in the same way as the direct problem, namely through the hydrodynamic analogy previously proposed by Carafoli. However, in addition to the singularities used to solve the direct problem, a logarithmic singularity must be introduced at the origin. It is in this way that the solution is obtained. General solutions are given for the thick wing with subsonic leading edges, for the thick wing with one supersonic leading edge, and for the thin wing.

Practical applications include conical motions of the first and second orders.

T. Oroveanu, Roumania

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BRT

Carafoli, E. ; Horovitz, B.

Cruciform wings; mixed problems of triangular wings fitted with perpendicular plate in supersonic flow. p. 819.

Academia Republicii Populare Romine. STUDII SI CERCETARI DE MECANICA APLICATA. Bucuresti, Rumania. Vol. 9, no. 4, 1958.

Monthly List of East European Accessions (EEAL) LC Vol. 9, No. 2, January 1960.

Uncl.

Carafoli, E. ; Nastase, A.

Study of thin triangular wings with forced symmetry in supersonic flow. p. 833.

Academia Republicii Populare Romine. STUDII SI CERCETARI DE MECANICA APLICATA. Bucuresti, Rumania. Vol. 9, no. 4, 1958.

Monthly List of East European Accessions (EEAL) LC Vol. 9, No. 2, January 1960.

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RUM/8-59-1-1/24

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AUTHORS: Carafoli, E., Săndulescu, S.

TITLE: Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, 1959, Nr 1, pp 7 - 40 (RUM)

ABSTRACT: This is a study on harmonically oscillating motions of ailerons around a joint. The authors establish in a preliminary section all important data, as follows: Considering a system of coordinates $Ox_1x_2x_3$, the hypothesis of small disturbances is given in Equation 1, in which U_∞ is the speed of the nondisturbed flow directed after the Ox_1 axis, a_∞ the speed of the sound, M_∞ the respective Mach number and $\varphi (x_1,x_2,x_3,t)$ the motion potential. Notating the pulsation of a periodic motion with ω the authors introduce the Equation 2; "h" being a reference length, e.g. the wing chord. In case of a harmonic oscillation motion, the motion potential could be [Ref 1] expressed in Equation 3, in which the reduced potential $\phi (x_1,x_2,x_3)$ is independent from the time, and its derivation in ratio of x_3 is the "vertical reduced speed", according to Equation 4. Computing the partial derivations of the motion potential and substituting them in Equation 1, the reduced potential are given in Equation 5.

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

Considering a polygonally shaped aileron which has an oscillating motion of small frequency around the joint 00^x, the oscillating motion of the $OA_1^{\prime}A_3^{\prime}0^x$ surface can be obtained by superposing the following harmonic oscillating motion [Ref 2]: $\Omega_1 = \Omega_0 e^{i\omega t}$ of the $OA_1^{\prime}A_2^{\prime}$ surface around the $OA_2^{\prime}$ axis, and $\Omega_2 = -\Omega_0 e^{i\omega t}$ of the $OA_3^{\prime}A_2^{\prime}$ surface around the $0^xA_2^{\prime}$ imaginary axis (Figure 1). Decomposing the first oscillating motion into its components and using the previously established general formulas [Ref 2], the authors deduce for the elevation of the point P of the coordinates x_1, x_2 (Equation 7) respectively for the vertical reduced speeds: $\beta_0 = -E_2$, (Nr 8) and $\beta_1 = i\frac{\lambda}{k}[E_1x_2 - E_2x_1\frac{1+2B^2}{B^2}]$ (Nr 8'). Proceeding in a similar way in case of the second oscillating motion, the elevation of the point P^x of the coordinates x_1, x_2, is expressed in Equation 9, and the reduced vertical speed by: $\beta^*_0 = E_2$, (Nr 10), $\beta^*_1 = -i\frac{\lambda}{k}[E_1x_2^* - E_2x_1^*\frac{1+B^2}{B^2}]$ (Nr 10'). Based on the formulae 8 and 10, the reduced potentials of both oscillating motions are expressed by: $\phi = \phi_1 + i\frac{\lambda}{k}\phi_2$, $\phi^* = \phi^*_1 + i\frac{\lambda}{k}\phi^*_2$, (Nr 11). The expressions of the pressure coefficients C_p and C_p^* can be obtained from the pressure equation of a nonpermanent motion given in Equations 12 and 12'. The reduced axial speeds:

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

$$u_o = \frac{\partial \phi_1}{\partial x_1}, \quad u_1 = \frac{\partial \phi_2}{\partial x_1}, \quad u_o = \frac{\partial \phi_1^*}{\partial x_1^*}, \quad u_1^* = \frac{\partial \phi_2^*}{\partial x_1^*} \qquad \text{(Nr 13)}$$

can easily be determined by using the results of previous works [Refs 4 and 5]. Using on the other hand the formulae of Euler for the potentials ϕ_1 and ϕ_1^*, the authors obtain: $\phi_1 = x_1(u_o + yv_o)$, and $\phi_1^* = x_1^* (u_o^* + yv_o^*)$, (Nr 14), and considering the connection between the respective reduced speeds, deduced from the compatibility relation, the potentials Φ_1 and Φ_1^* can be easily determined, if u_o respectively u_o^* are known. The authors then are examining polygonally shaped ailerons with subsonic and supersonic leading edges, triangular ailerons, trapezoidal ailerons, trapezoidal ailerons with subsonic and supersonic edges and rectangular ailerons. At the study of harmonic oscillations of ailerons with subsonic or supersonic leading edges, the joint can have every position in ratio of the Mach cone. The expressions of the reduced axial speeds and of the potentials of both oscillating motions have been determined in a previous work [Ref 2] and are not derived any more, but only mentioned, since they define the pressure coefficients C_p and C_p^*. In case of an oscillating motion of the $OA_1'A_2'$ surface (Figure 2), the aileron has a supersonic and a subsonic leading edge (OA_1'), as well as an OA_2' edge, which makes the

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

reduced vertical speed to have a leap of 0 value to left and of β_o value to right for the homogeneous of the first order and from 0 to β_1 for the homogeneous motion of the second order. In these conditions the authors establish the expressions u_o (Equation 16) and ϕ_1 (Equation 16") for the homogeneous motion of the first order, and u_1 (Equation 17) for the homogeneous motion of the second order. Studying the oscillating motion of the $OA_3'A_2'$ surface, the authors consider an aileron with supersonic leading edges, the reduced vertical speed being zero, and β_o being in its interior. The homogeneous motion of the first order is given by u_o^* (Equation 18) and ϕ_1^* (Equation 18'). In case of the homogeneous motion of the second order, the reduced axial speed can be obtained by the expression u_1^* (Equation 19). The authors then compute the lift coefficient, C_{z1} being the partial lift coefficient as an effect of the first oscillating motion and C_z^*, resulting of the second oscillating motion. If the joint OO^* is subsonic, the lift coefficients can be computed according to Equations 23 and 23'. For the computation of the proper lift coefficient of the proper aileron, the authors deduce the expressions 25 and 25'. In case of a supersonic OO^* joint, the partial lift coefficients are more simple than in the Equations 27 and 27'. At the calculation of the resistance co-

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

efficient, the contribution of the total power produced on the aileron, contribution of the power which acts only upon the mobile $OA_1^{!}A_3^{1}O^*$ surface, and contribution of the suction which appears only in case of subsonic leading edges have to be taken in consideration. The resistance coefficient C_{xa} at the advancing is given in Equation 29, S_m being the area of the $OA_1^{!}A_3^{1}O^*$ mobile surface. The axial disturbance speed "u", given in Equation 33 is deduced from the Equation 3. Replacing ϕ_1, $\frac{\partial \phi_1}{\partial x_1}$ and $\frac{\partial \phi_1}{\partial x_1}$ by the expressions 16, 16' and 17), making $x \rightarrow l_1$ and putting into evidence the factor $\sqrt{r}$, the expression for $(u)_{x \rightarrow l_1}$ (Nr 34) is deduced. The suction force S_c can now be calculated by a simple integration. The authors finally deduce the expression for C_{xs} (Nr 35) which is the same for every position of the joint against the Mach cone. This term becomes imaginary if the $OA_1^{!}$ leading edge becomes supersonic. Notating with C_{l1} the coefficient of the rolling moment of the first oscillating motion and with C_l^* the coefficient of the rolling moment of the second oscillating motion, the total coefficient of the rolling moment can be expressed by Equation 36. If the joint OO^* is subsonic, the coefficients of the rolling moment are given by the expressions 37 and 37'. In case that the joint OO^* is supersonic, these coefficients are given by the expressions 39 and 39'.

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The coefficient of the pitching moment is given by:

$$C_{ma} = C_{ml} + C_m^{*} (1 - \frac{h^*}{h}) C_z^* \quad \text{(Nr 40)},$$

in which the coefficients of the pitching moment appearing as an effect of the two motions C_{ml} and C_m^* are given by the relations 41 and 41'. If the joint is subsonic, the coefficients of the pitching moment are given by the expressions 42 and 42'. The coefficients referring to the proper aileron, are given by the relations 43 and 43'. If the joint is supersonic, the coefficients of the pitching moment are supplied by the Equations 44 and 44'. The coefficient of the control surface moment C_{mca} can be obtained from: $C_{mca} = C_{mcl} + C_{mc}^*$, (45) in which C_{mcl} results from the first motion and C_{mc}^* from the second oscillating motion. The partial aerodynamical coefficients which interfere in the formulae 46 and 46' refer only to the mobile surfaces. The authors then proceed to the calculation of the coefficients of polygonal ailerons with a supersonic leading edge. The $OA_2^!$ edge of the $OA_1^!A_2^!$ surface (Figure 4) causes to the reduced vertical speed a leap of 0 value to left and of β_o value to right for the homogeneous motion of the first order, respectively from 0 to β_1 for the homogeneous motion of the second order. In this situation the authors have already

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

established in a previous work [Ref 2] the expressions for the reduced axial speeds and reduced potentials: u_o, ϕ_1 (47 and 47') for the homogeneous motion of the first order and u_1 (Nr 48) for the homogeneous motion of the second order. Regarding the oscillating motion of the $O^* A_3^1 A_2^1$ surface, the reduced axial speeds u_o^* and u_1^*, respectively the potential ϕ_1^* are defined by the relations (18, 19 and 18'). In this situation the pressure coefficient C_p^* (Equation 12') remains unchanged, a fact which causes that the partial aerodynamical coefficient remains also unchanged. The lift coefficient of the subsonic leading edge can be computed by the relation 20. The lift coefficient referring to the whole surface covered by the Mach cone, the OO^* joint being subsonic, can be computed in relation 49. If the OO^* joint is supersonic, C_{z1} is supplied by the relation 51. Resistance coefficient at the advancing: if the leading edge of the aileron is supersonic, there is no suction force, thus the formula 29 is simplified in Formula 52. If the OO^* joint is subsonic, C_{za} will be replaced by the expression computed for the entire surface affected by the oscillating motion of the aileron. C_z^f and C_{z1} will be replaced by the relation 25', respectively 50. S and S_m are the surfaces

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

$OA_1'D_2'$, respectively $OA_1'A_3'O^*$ (Figure 4). If the joint is supersonic, C_{za} is the lift coefficient of the aileron and C_{z1} and C_z^* are given by the formulae 51 and 27'. The total coefficient of the rolling moment in ratio of the Ox_1 axis is given by the formula 36. If the OO^* joint is subsonic, the coefficient of the rolling moment is given in relation 53. The same coefficient of the proper aileron is given by the relation 54 and in case the joint is supersonic by relation 55, C_1^* being given by Nr 39'. The coefficients of the pitching moment are given in case the joint OO^* is subsonic by the expression 56; in case of the proper aileron by the expression 57 and in case that the joint is supersonic by the expression 58. The formulae which allow the computation of the control surface moment were previously mentioned in Equations 45, 46 and 46'. The results obtained above can be also used for the computation of triangular ailerons. In case of trapezoidal ailerons with a subsonic leading edge, the expressions of the reduced axial speeds and reduced potentials can be deduced from the relations of the polygonal ailerons. The partial coefficients of the first oscillating motion are given by expressions 60, 61, 62 and 63, and for the second oscillating motion in expressions 64,

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Aerodynamical Characteristics of Ailerons Having a Harmonic Oscillation in Supersonic Regions

the partial coefficients referring to the entire surface affected by the oscillating motion of the aileron. Finally the authors present a table of constants.
There are: 5 diagrams and 5 references, 2 of which are English, 2 French and 1 Rumanian.

SUBMITTED: October 28, 1958

Card 10/10

CARAFOLI, E.; MATEESCU, D.

Supersonic flow around the system carrying a conic wing fuselage. In French. p.377.

REVUE DE MECANIQUE APPLIQUEE. (Academia Republicii Populare Romine. Institutul de Mecanica Aplicata)
Bucuresti, Rumania
Vol. 4, no. 3, 1959.

Monthly list of Eastern European Accession Index (EEAI) LC vol. 8, No. 11
November 1959
Uncl.

R/008/60/000/001/001/009
A125/A026

10.6120

AUTHORS: Carafoli, Elie and Mateescu, Dan

TITLE: General Method of Determining the Interference of Wing and Conical Fuselage in Supersonic Regime

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, 1960, No. 1, pp. 11-47

TEXT: In a previous work (Ref. 1), the authors presented a method of solving the problem of supersonic flow around a wing/conical fuselage system. In subject article, this method is extended to the case of a wing with edges on which there are incidence and inclination leaps, thus establishing a general method of solution of the supersonic flow around the wing/conical fuselage system. Considered is a wing/fuselage system (Fig. 1), where the fuselage axis has the incidence α_0 against the undisturbed flow U_∞, and the wing has a constant incidence and inclination. The authors assume that the fuselage has reduced dimensions against the Mach cone ($B^2c^2 \ll 1$), that the incidence and the inclination, as well as the α_0 incidence of the fuselage are small enough for the application of the theory of small disturbances. The stream around this system can be decomposed into: I) symmetric axial stream around the isolated

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conical fuselage without incidence; II) motion around the conical fuselage/thin wing system; and III) motion around the conical fuselage/symmetric thick wing system. The authors treat the last two motions and first present the usual notations and formulae. For the solution of the problem they deduce the boundary conditions of the function v. Based on the function (13) and the compatibility relation, the solution of the motion is expressed by (14). The boundary conditions are now more simple and can be expressed by (15), (16), (17) and (18). Based on the conform transformation (3), the relation (19) is obtained for the X plane, from which result the boundary conditions (20), (21), (22) and (23) in the X-plane (Figs. 3a, b, c). The function v_a presents the same singularities (24), (25) and (26), and satisfies the boundary condition (23) as the function $\frac{dF}{dX}$, thus: $\frac{dF}{dX} = v_a$, (29). Replacing $\frac{dF}{dX}$ by its value from (19) in the relation (14), the axial disturbance speed u, which is a real part of the expression (30) is obtained. u_a and v_a of this expression represent the solution of the conical stream around the fictive wing. Thus, the problem of the supersonic stream around the wing/conical fuselage system has been re-

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General Method of Determining the Interference of Wing and Conical Fuselage in Supersonic Regime

duced to a conical stream around a fictive, isolated wing with variable incidence. In paragraph 3, the authors determine the solution of the problem for different particular cases selected in such a way that, adding the effects, the solution of the general case of the wing/conical fuselage system could easily be determined if the wing incidence is constant on the sections. They first treat the case, where the whole system has the same incidence and then some cases where the wing has incidences on the sections which are different from that of the wing. The following particular cases are examined: 1) The wing and the fuselage have the same α_o incidence; 2) The wing has an α_o incidence on the M_1A_1 section, the rest of the wing and the fuselage axis having no incidence; 3) The wing has an incidence α_2 on the A_2M_2 section, the rest of the wing and the fuselage axis having no incidences; 4) The wing has an α incidence on the A_2M_2 and A_1M_1 sections, the rest of the wing and the fuselage axis having no incidence; 5) The whole wing has an α incidence, the fuselage axis having no incidence; and 6) Application examples, where the authors present the expressions of the axial-disturbance speeds for the most interesting cases. Finally

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A125/A026

General Method of Determining the Interference of Wing and Conical Fuselage in Supersonic Regime

they treat the motion around a conical fuselage/symmetric thick wing system (Fig. 4). There are 3 figures and 3 references: 1 Rumanian, 1 English and 1 Austrian (German).

SUBMITTED: October 29, 1959

Card 4/4

84648

10.6120 3515, 2310, 2207

R/008/60/000/002/001/007
A125/A026

AUTHORS: Carafoli, Elie, and Mateescu, Dan

TITLE: Supersonic Flow Around a Conical Cross-Wing/Fuselage System

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, 1960, No. 2, pp. 325-337

TEXT: The authors treat the problem of flow around a conical cross-wing - fuselage system provided with a normal plate (Fig. 1), for the case where the leading edges of the wing and of the plate are subsonic and the angle of imidence of the fuselage differs from those of wing and normal plate. The study starts from the hypothesis of minor disturbances, taking into account that the dimensions of the fuselage are small enough in relation to the Mach cone, and that the angles of incidence of wing, normal plate and fuselage are also sufficiently small. The general flow around the system investigated is decomposed into three movements: the 1st is the axial-symmetric flow around the bare conical fuselage - which is known -, the 2nd is the flow around the system symmetric plate/fuselage - which was the object of another paper by the same authors (Ref. 1), and the last one is the flow around the system cross-wings/fuselage, with the plate and the fuselage being without lateral angles of incidence; this latter movement is the sub-

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R/008/60/000/002/001/007
A125/A026

Supersonic Flow Around a Conical Cross-Wing/Fuselage System

ject of this paper. The problem is referred to a conveniently chosen plane where it is reduced to the problem of determining two simple movements: a conical one around a very thin cross-wing, and a plane one around a circle. The authors give the general expression for the axial speed of disturbance u, indicating the method of determining the constants. There are 3 figures and 4 Rumanian references; 2 of these were published in English and 2 in French.

SUBMITTED: February 12, 1960

Card 2/2

85031

R/008/60/000/003/001/007
A125/A026

10.6000

AUTHORS: Carafoli, E., and Săndulescu, Ş.

TITLE: Harmonic Oscillating Motion of Tails at Supersonic Speed

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, 1960, No. 3, pp. 557-568

TEXT: Subject article analyses some problems regarding the non-permanent supersonic flow around a tail referred to an orthogonal system of coordinates $Ox_1x_2x_3$. Supposing that the points of the horizontal and vertical surfaces have a harmonic motion (Ref. 2, 3), the components of the normal speed on the horizontal and vertical surfaces are defined and the components of the reduced normal speed are determined by the expressions (6a) and (6b). The pressure coefficient shows that for the determination of the pressure on the tail it is necessary to know the reduced axial speeds and the reduced potentials. This way a series of problems regarding the harmonic flow around the tail can be solved. The authors examine two cases: a tail moving in a disturbed and harmonically non-stationary flow behind the wings (due to the vibrations of the wing); and oscillations of the tail around the center of gravity of the aircraft. They first consider an oscillation of the tail of small frequency and amplitude around an axis, having

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R/008/60/000/003/001/007
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Harmonic Oscillating Motion of Tails at Supersonic Speed

any position in the space. In this casethe reduced vertical speed on the two surfaces can be determined. The problem is finally brought to the study of the conical motions of the first order defined by the potentials ϕ_1 and ϕ_1^*, and of a conical motion of the second order defined by ϕ_2. The reduced speeds correspond to the harmonic oscillating motions of an isolated wing, identical in shape with the vertical surface. The conical motions corresponding to the reduced speeds are studied considering the interference. The pressure coefficient of this motion is expressed by the relation (17), which can be expressed by knowing the expressions (18), in which u_0 and u_0^* are the reduced axial speeds of the conical motion of the first order and u_1 the reduced axial speed of the conical motion of the second order. Using the general results previously published in (Refs. 6,7) u_0 is determined by the expression (25) and u_0^* by (30). Starting with the formula of Euler (31) the authors deduce the reduced potentials of the conical motion on the horizontal (ϕ_{1or}) and vertical (ϕ_{1v}) surfaces, expressed by (35a) and (35b). Starting again with the formula of Euler (37), they deduce the reduced axial speeds of the conical motion of the second order on the horizontal (u_{1or}) and vertical (u_{1v}) surfaces, expressed by (43a) and (43b). The

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R/008/60/000/003/001/007
A125/A026

Harmonic Oscillating Motion of Tails at Supersonic Speed

authors finally determine the constants used in these expressions. There are 2 figures and 9 references: 6 Rumanian (4 published in French, 1 in English and 1 in Rumanian), 2 English and 1 Soviet.

SUBMITTED: March 9, 1960

Card 3/3

23654
R/008/60/000/004/001/013
A125/A126

10.9001

AUTHORS: Carafoli, Elie, and Năstase, Adriana

TITLE: Thin triangular wing of minimum drag in supersonic stream

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, no. 4, 1960, 817 - 833

TEXT: The authors determine the shape of a thin non-symmetrical triangular wing, having a minimum drag, when lift, diving moment and plane projection are given. By treating the non-symmetrical triangular wing, they are considering the general case which is then applied to delta wings, polygonal wings and trapezoidal wings, as performed in a previous paper (Ref. 1: Elie Carafoli, Adriana Nastăse, Aripi trapezoidale de rezistenţă minimă în curent supersonic. (Triangular Wing of Minimum drag in Supersonic Stream) Comunicare făcută la Primul Congres Unional de Mecanică teoretică şi aplicată de la Moscova, Ianuarie 27 - Februarie 3, 1960 [sup tipar, în revistă sovietică Mekhanika]). Furthermore, the authors assume that there is an additional separation edge OC on the wing (Figure 1), which can eventually be taken as the joint of a leading-edge flap. Suction forces appearing on the subsonic leading edges have been included in the calcula-

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23654

R/008/60/000/004/001/018

Thin triangular wing of minimum drag A125/A126

tion of the drag. Considering the general expression of the axial disturbance speed u given in a previous work by E. Carafoli, M. Ionescu (Ref. 13: Ecoulements conique d'ordre supérieur autour des ailes triangulaires minces ou à épaisseur symétrique. Revue de Mécanique Appliquée, 1, 1957), the authors could systemize the calculation in such a manner that the determination of a triangular wing with separation edge and minimum drag is reduced to the calculation of a single type integral, which they designate I_k and for which they give a formula of simple algebraic recurrence. The authors then indicate the application of the method to all wings with minimum drag being used at present: delta wings, trapezoidal and rectangular wings, and polygonal wings. There are 3 figures and 14 references 5 Soviet-bloc and 9 non-Soviet-bloc. The four references to the English language publications read as follows: E. W. Graham, The Calculation of Minimum Supersonic Drag by Solution of an Equivalent Two-dimensional Potential Problem. Douglas Aircraft Report, SM-22666, Dec. (1956); - Note on the Use of Artificial Distribution of Singularities in Supersonic Minimum Drag Problems, Douglas Aircraft Corporation, Report No. SM-23022, Dec. (1957); E. W. Graham, A Geometric Problem Related to the Optimum Distribution of Lift on Planar Wing in Supersonic Flow. Journal of Aero-Space Siences, Dec. (1958); Kainer, Calculation of the Optimum Supersonic Delta Wings. CONVAIR (San Diego) Report ZA 259 Oct (1957).

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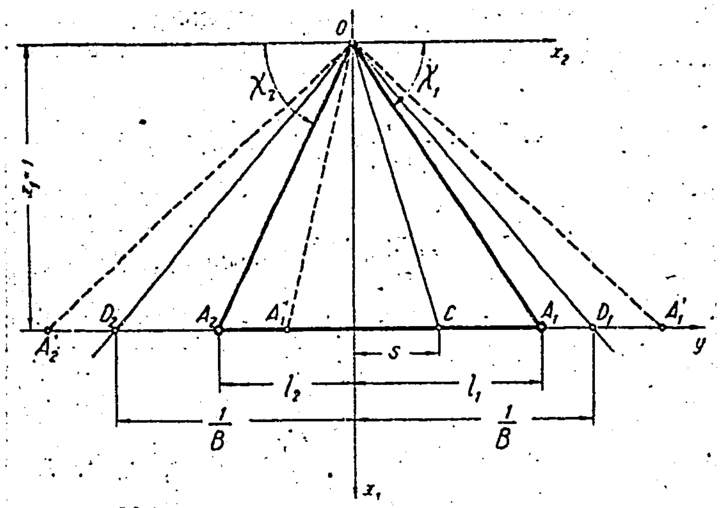
R/008/60/000/004/001/018
A125/A126

Thin triangular wing of minimum drag ....

Figure 1: Non-symmetrical triangular wing.



Card 3/3

KARAFOLI, Ye. (Bukharest) [Carafoli, Elie]

Theory of simple and cruciform aelta wings in a supersonic flow. Inzh.sbor. 27:17-28 '60. (MIRA 13:6)
(Airfoils) (Aerodynamics, Supersonic)

CARAFOLI, Elie, acad.

Development of scientific research in the Institute of Applied Mechanics of the Rumanian Academy. Studii cerc mec apl 11 no.6: 1345-1360 '60.

1. Membru al Comitetului de redactie si redactor responsabil, "Studii si cercetari de mecanica aplicata."

38395

R/008/62/013/002/001/009
D272/D308

10.1210

AUTHORS: Carafoli, Elie, and Mateescu, Dan

TITLE: Interference between wing and body in high order conical flow

PERIODICAL: Studii și cercetări de mecanică applicată, no. 2, 1962, 275 - 294

TEXT: As a continuation of previous studies on the conical supersonic flow around simple or cross-shaped wings with conical body (Revue de Mécanique Appliquée, Acad. R.P.R., no. 3, 1959, no. 2, 1960, no. 3, 1960, no. 3, 1961) the system wing-conical body, placed into a supersonic current, is studied in the case when the wing incidence is distributed in the wing plane according to a function, which can be represented as a sum of homogeneous polynoms of different orders. This case is considered under general conditions, when the vertical velocity distribution on the wing is different on its various portions separated by vector radii drawn from the tip. It is assumed that the wing is fitted with ridges which separate two different regimes of incidence distribution. The method developed permits easy
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solution of the problem in the case of nonuniform flow, as well as of the problem of low frequency oscillations of the same system, which in fact reduces to the study of two conical motions of different order. The case of the thin wing is treated first, considering for this purpose a conical motion of n-th order around the system, the axis of the body being parallel to the undisturbed flow velocity and the wing incidence, and hence the vertical velocity on the wing being distributed in the form of homogeneous polynoms of (n-1)th order. It is then proved that the problem of the supersonic flow around the system considered, can be reduced to determination of a certain function corresponding to the flow around a fictitious wing only with a certain incidence distribution. This function and its constant parameters are determined. The method is then extended to the case of the system body-thick wing, and to the system wing-conical body placed into a non-uniform flow, determining in each case the function and its constants. There are 4 figures.

SUBMITTED: December 27, 1961

34911
R/008/62/000/001/001/007
D272/D304

10.1210

AUTHORS: Carafoli, Elie and Ghia-Nastase, Ariana

TITLE: Minimum drag problem of the wing of symmetrical thickness in supersonic flow

PERIODICAL: Mecanică aplicată, 13 no. 1, 1962, 11-24

TEXT: The purpose of the study was to determine the shape of the surface of a wing with symmetric thickness, having minimum drag in supersonic currents. It is assumed that several geometrical conditions are given -- the plane projection (an asymmetrical triangle), the volume of the wing, the closing of the wing on its leading and trailing edges, the continuity of the wing surface at the crossing of an edge; for generalization, it is also assumed that the wing is fitted with a separation ridge. The variational method was chosen for the present study, but for the axial perturbation velocity u the authors used an expression derived by E. Carafoli and M. Ionescu (Ref. 11: Revue de Mécanique Apliquée, no. 1, 1957). The problem is reduced to a single type of integral

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which is denoted by I_K, and for which a simple algebraic recurrence formula is given. The results are discussed, indicating that they can be particularized with ease, obtaining several wings of practical importance -- the delta wing, the trapezoidal wing, the rectangular wing, and the polygonal wing. These wings are then analyzed in the two possible cases for each -- with or without edges -- by means of the relations obtained in the general case. It is concluded that these results will enable the study of wings of general shape with minimum drag as well as of thick wings provided with normal plates and with minimum drag. There are 2 figures and 14 references: 8 Soviet-bloc and 6 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: W. E. Graham - Douglas Aircraft Corporation Reports, S. M. 22666, Dec. 1956, S. M. 23022; M. E. Graham and Pa. Lagerstrom, D. A. C. R., S. M. 23901, March 1960; F. Strand, Minimum Wing Wave Drag with Volume Constraint. Journal of Aero Space Science, August (1960).

SUBMITTED: October 11, 1961

Card 2/2

X

CARAFOLI, Elie, acad.

Some theoretical considerations on lateral fluid jets. Studii cerc mec apl 13 no.5:1061-1072 '62.

1. Membru al Comitetului de redactie si redactor responsabil, "Studii si cercetari de mecanica aplicata".

CARAFOLI, E.; BERBENTE, C.

Aerodynamic characteristics of profiles in supersonic-hypersonic flow in the case of neglecting the pressure losses due to shock waves. Rev mec appl 8 no.5:729-744 '63.

CARAFOLI, E.; BERBENTE, C.

Aerodynamic characteristics of profiles in supersonic-hypersonic flow in the case of neglecting pressure losses due to shock waves. Studii cerc mec apl 14 no.4:751-767 '63.

L 18339-65 EWT(l)/EWP(m)/EWG(v)/FCS(k) Pd-1/Pe-5 AFTC(a)/BSD/AEDC(a)/
SSD(b)/ASD(f)-2/ASD(p)-3/SSD/AFWL/AFETR WW
ACCESSION NR: AP4049971 R/0019/64/009/005/0985/0998

28
27
B

AUTHOR: Carafoli, E.; Berbente, C.

TITLE: Determination of the characteristics of aerodynamic profiles in supersonic-hypersonic flow, considering the pressure losses due to shock waves

SOURCE: Revue Roumaine des sciences techniques. Serie de mecanique appliquee, v. 9, no. 5, 1964, 985-998

TOPIC TAGS: aerodynamic profile characteristic, supersonic flow, hypersonic flow, shock wave, pressure loss, cambered profile, broken profile, pressure distribution formula

ABSTRACT: By employing a previously derived unitary formula for determining the pressure distribution (Carafoli, Revue de mecanique appliquee, Acad. R.P.R., vol. 7, no. 5, 1962), the authors derived analytical expressions for calculating the characteristics of aerodynamic profiles in supersonic-hypersonic flow. It was assumed that the waves are attached to the leading edge of the profile and that

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L 18339-65
ACCESSION NR: AP4049971

the flow behind them remains supersonic. Pressure losses due to the shock waves are taken into consideration. The ordinary broken profiles which were considered include flat planes and profiles of symmetrical thickness (up to 14% of the chord), the cambered profiles include double parabolic profiles and parabolic plane profiles; in addition, special profiles were analyzed. A comparison of the results obtained from use of these formulas with the results from using expansion tables and shock wave tables shows that the formulas may be good replacements for relatively laborious calculations involving the use of tables and graphical integration of pressures, over a wide range of deflection angles (up to ± 35 deg) and Mach numbers (up to $M_\infty = 9$). Orig. art. has: 10 figures and 36 formulas.

ASSOCIATION: Bucharest Polytechnic Institute

SUBMITTED: 00 ENCL: 00 SUB CODE: ME

NO REF SOV: 000 OTHER: 004

Cord 2/2

L 21430-65 EWP(m)/EWA(h)/EWP(k)/EWT(d)/EWT(1)/EWT(m)/FCS(k)/EWA(d)/EWA(1)/EWP(w)/ EWP(v) Pd-1/Pf-4/Peb AEDC(a)/ASD(f)-3/AFETR/AFTC(a) EM
ACCESSION NR: AP5001259 P/0033/64/016/003/0813/0827

AUTHOR: Carafoli, E. (Bucharest); Nastase-Ghia, A. (Bucharest)

TITLE: The use of a method of residues for the study of the minimum resistance of a trapezoidal wing within a supersonic flow

SOURCE: Archiwum mechaniki stosowanej, v. 16, no. 3, 1964, 813-827

TOPIC TAGS: aerodynamics, supersonic flow, trapezoidal wing, minimum air resistance

ABSTRACT: In an earlier paper, the authors (Mekhanika, 1, 1961, Moscow) reduced the minimum resistance problem to the solution of a linear algebraic system. However, the calculation of its coefficients lead to an integral of the type

$$J_q = \int \frac{y^q\,dy}{\sqrt{B(l_1 - y)(1 + By)}} \qquad (1.1)$$

whose evaluation is quite tedious. To avoid these difficulties another method has been devised for the calculation of the aerodynamic characteristics which, using the function of complex variables, leads to the method of residues. It generates the same linear algebraic

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ACCESSION NR: AP5001259

equations but the coefficients turn out to be fully defined without any integration. The method is used here for the determination (within a supersonic flow) of the surface of a thin trapezoidal wing having the minimum drag, as well as the lift, pitch, central profile, and the plane projection (assuming a symmetrical trapezoid). Orig. art. has: 55 formulas and 5 figures.

ASSOCIATION: Institute of Applied Mechanics, Academy of the Romanian Peoples Republic

SUBMITTED: 00 ENCL: 00 SUB CODE: ME, AC

NO REF SOV: 001 OTHER: 005

Card 2/2

L 15723-66 EWT(d)/EWT(1)/EWP(m)/EWP(w)/EWA(d)/T-2/EWP(k)/EWA(h)/FCS(k)/ETC(m)-6/ EWA(1) EM

ACC NR. AP6000145 SOURCE CODE: RU/0008/65/019/004/0991/1007

AUTHOR: Carafoli, E.; Radulescu, S.

ORG: "Traian Vuia" Institute of Fluid Mechanics, Academy of Rumanian R. S. (Institutul de mecanica fluidelor "Traian Vuia" al Academiei R. S. Romania)

TITLE: The supersonic flow around a thin delta wing in drift

SOURCE: Studii si cercetari de mecanica aplicata, v. 19, no. 4, 1965, 991-1007

TOPIC TAGS: aerodynamics, supersonic flow, thin wing, delta wing

ABSTRACT: The action of the drift on the aerodynamic characteristics of a thin delta wing is investigated in the case of supersonic conical flows. By applying the residues method, the aerodynamic coefficients for a wing in which both edges are subsonic, are calculated. For a wing with a subsonic and a supersonic edge, only the roll and turn coefficients are given, because the small values of the drift have a negligible effect on the coefficients of attitude, resistance, and drag. Orig. art. has: 104 formulas.

SUB CODE: 20 / SUBM DATE: 28Apr65 / ORIG REF: 002

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L 20655-55 FS(m)/EWP(m)/EWP(w)/EWA(d)/T-2/EWP(k)/EWA(h)/ETC(m)-6/EWA(1) EM

ACC NR: AP5025353 SOURCE CODE: RU/0019/65/010/003/0627/0635

AUTHOR: Carafoli, E.

ORG: Institute of Fluid Mechanics of the Academy of the R.P.R., Bucharest

67
B

TITLE: Extension of conical motions to quasi-conical motions

SOURCE: Revue Roumaine des sciences technique. Serie de mecanique applique, v. 10, no. 3, 1965, 627-635

TOPIC TAGS: motion mechanics, conic flow, swept wing, pressure effect, pressure measurement, surface pressure, aerodynamic characteristic

ABSTRACT: Problems of conical and quasi-conical motions as applied to modern types of aircraft were analyzed. The author extends the conical and high-order conical flows to the so-called quasi-conical flows, to calculate the pressure on the surface of wings or on the wing-body system employed in aeronautics. For simplification, only methods and indications were given without developing all the applications in the case of high-order conical or quasi-conical motions. A more detailed analysis and more general applications will be given in future works. Orig. art. has: 4 figures and 40 formulas. [Based on author's abstract]

SUB CODE: 01, 20/ SUBM DATE: 19Feb65/ OTH REF: 002

[NT]

Card 1/1 BK

L 24126-66 FS(m)/EWP(m)/EWP(w)/EWA(d)/T-2/EWP(k)/EWA(h)/ETC(m)-6/EWA(:)

ACC NR: AP5014665 WW/EM SOURCE CODE: RU/0019/65/010/002/0489/0504

AUTHOR: Carafoli, E.; Mateescu, D.

ORG: Institute of Applied Mechanics of the Academy of the Romanian Peoples' Republic (Institut de Mecanique Applique de l'Academie de la Republique Populaire Roumaine)

TITLE: A class of Delta wings whose incidence and slope vary in accordance with homogeneous functions under supersonic conditions

SOURCE: Revue Roumaine des sciences techniques. Serie de mecanique appliquee, v. 10, no. 2, 1965, 489-504

TOPIC TAGS: Delta wing, perturbation, function, wing incidence

ABSTRACT: Higher-order conic motions are applied to the study of triangular wings with variable incidence and slope (or corresponding vertical velocities), using homogeneous functions of various orders. To this end, the problem is reduced to a study of a wing having an unbroken interval of basic stops which makes it possible to use the results obtained by the authors in their previous studies. As practical examples, the expression is determined for the axial velocity of perturbation for a series of thin wings of symmetrical thickness whose incidence and slope vary in accordance with homogeneous functions of the order of zero and one. Orig. art. has: 60 formulas. [DW]

SUB CODE: 01/ SUBM DATE: 07Jan65/--Mar65 OTH REF: 002/

Card 1/1

L 34383-66 EWP(m)/EWP(w)/T-2/EWP(k) WW/EM

ACC NR: AP6022636 SOURCE CODE: RU/0019/66/011/003/0587/0613

AUTHOR: Carafoli, E.; Berbente, C.

ORG: [Carafoli] Institute of Fluid Mechanics, Academy of the Socialist Republic of Rumania; [Berbente] Polytechnic Institute G. Gheorghiu-Dej, Bucharest

TITLE: Determination of pressures and aerodynamic characteristics of delta wings in supersonic-moderate hypersonic flow

SOURCE: Revue Roumaine des sciences techniques. Serie de mecanique appliquee, v. 11, no. 3, 1966, 587-613

TOPIC TAGS: hypersonic aerodynamics, aerodynamic characteristic, aerodynamic drag, lift, wave drag, pressure distribution, three dimensional flow, delta wing, angle of attack

ABSTRACT: The formula for calculating the pressure distribution on aerodynamic profiles in hypersonic ($M_\infty \approx 7$) flow previously derived by one of the authors is applied to the case of a three-dimensional flow regime, in which an equivalent deflection θ is introduced instead of the deflection τ of the flow, which can be expressed only in terms of the axial disturbance velocity which is denoted by u and is deduced by the small disturbances method. Consequently, the formula has the advantage of being a function of this velocity alone, whose expression

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is perfectly determined from the conical flow theory for all cases of current application. The relative effect of the boundary layer on pressure distribution at various M is discussed. The conical thick wing, the delta wing with constant slope, the double conical delta wing, the rectangular wing with diamond-shape profile, and the wing with double parabolic profile were considered. Comparison of the results with available experimental data concerning both the pressure distribution and the overall aerodynamic characteristics shows that the formula may now be successfully employed in exact calculations of the aerodynamic characteristic of various profiles in the wide range of angle of attack (up to 17°) and Mach numbers considered here. Orig. art. has: 18 figures and 63 formulas. [AB]

SUB CODE: 20/ SUBM DATE: 28Jan66/ ORIG REF: 004/ OTH REF: 003
ATD PRESS: 5033

Card 2/2

L 43033-66 EWP(m)/EWP(w)/T-2/EWP(k) EM

ACC NR: AP6029839 SOURCE CODE: RU/0019/66/011/004/0379/0892

66
B

AUTHOR: Carafoli, E.; Pantazopol, D.

ORG: Institute of Fluid Mechanics, Academy of Sciences of the Socialist Republic of Rumania (Institut de Mecanique des Fluides, Academie de la Republique Socialiste de Roumanie)

TITLE: Deviation of a two-dimensional supersonic flow by a jet-flap 26

SOURCE: Revue Romaine des sciences techniques. Serie de mecanique appliquee, v. 11, no. 4, 1966, 879-892

TOPIC TAGS: supersonic aerodynamics, hypersonic aerodynamics, jet flow, gas jet, jet flap, shock wave

ABSTRACT: A simple method is presented for determining the deviation of supersonic and hypersonic plane-parallel flows of an inviscid gas produced by an auxiliary thin jet layer (jet-flap). This method is based on a formula derived previously by Carafoli which makes it possible to determine the pressure coefficient in terms of the deviation angle, and which may be applied either in the case of compression behind a shock wave or continuous expansion, over a wide range of deviation angles. Approximate parametric equations for the jet trajectory and the maximum range of variation of the pressure coefficient, and simplified formulas valid for small deviations are

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derived. The results of numerical calculations presented in graphs and tables are given as illustrative examples. Orig. art. has: 4 figures, 44 formulas, and 3 tables. [AB]

SUB CODE: 20/ SUBM DATE: 30May66/ ORIG REF: 005/ OTH REF: 006 ATD Press 5065

Card 2/2

L 08547-67 EWP(m)/EWP(w)/EWP(k) IJP(c) WW/EM

ACC NR: AP6035397 SOURCE CODE: RU/0008/66/023/005/1343/1353

40

AUTHOR: Carafoli, E.; Mateescu, D.

ORG: Institute of Fluid Mechanics, Academy of the Rumanian Socialist Republic (Institutul de mecanica fluidelor al Academiei Republicii Socialiste Romania)

TITLE: The harmonic oscillatory movement of a wing conical body system under supersonic conditions

SOURCE: Studii si cercetari de mecanica aplicata, v. 23, no. 5, 1966, 1343-1353

TOPIC TAGS: harmonic oscillation, conic body, supersonic flow

ABSTRACT: This work studies the non-constant supersonic flow around the wing-conical body system where the harmonic oscillatory movement is of low frequency. Considering the case of the harmonic rotation oscillations of pitching and rolling, as well as of translation along the vertical axis, the problem is reduced through analogy with the case of detached wings to the study of constant conical movements of the order of 1 and 2 around the wing-conical body system. In order to determine these, the authors use the results obtained in their previous works. An expression of the coefficient of pressure is obtained with a view towards ascertaining the distribution of pressures upon the system under consideration. The problem studied here is applicable to the development of supersonic aircraft. Orig. art. has: 51 formulas and 3 figures.

SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 006/ OTH REF: 001/ ATD PRESS: 5104

UDC: 533

L 10017-67 EWP(m)/EWP(w)/EWP(v)/EWP(k) IJP(c) WW/EM

ACC NR: AP6036267 SOURCE CODE: RU/0019/66/011/005/1229/1239

AUTHOR: Carafoli, Elie; Mateescu, Dan

51

ORG: Institute of Fluid Mechanics, Academy of the Rumanian Socialist Republic

TITLE: Harmonic oscillatory motion of a wing-conic fuselage system in a supersonic flow

SOURCE: Revue Roumaine des sciences techniques. Serie de mecanique appliquee, v. 11, no. 5, 1966, 1229-1239

TOPIC TAGS: supersonic aerodynamics, conic flow, unsteady flow, aerodynamic roll, aerodynamic pitch, harmonic oscillation

ABSTRACT: The present paper is concerned with a study of supersonic, unsteady flows over a wing-conic fuselage system subjected to harmonic low-frequency oscillations. In this case, the motion of the wing-conic body system considered here (Fig. 1) is composed of the following three motions: 1) harmonic oscillatory pitch about the Ox_2-axis; 2) harmonic oscillatory translation along the Ox_3-axis; and 3) harmonic oscillatory roll around the Ox_1-axis, assuming that these oscillatory motions are of small amplitude and that the transverse dimensions of the fuselage are sufficiently reduced with respect to the Mach cone. This problem is reduced to the study of three supersonic steady conic flows, two of which are pure conic flows over a wing-conic body system, but the third is a second-order conic flow over the same system. Solutions for these flows can be obtained by using the method developed previously

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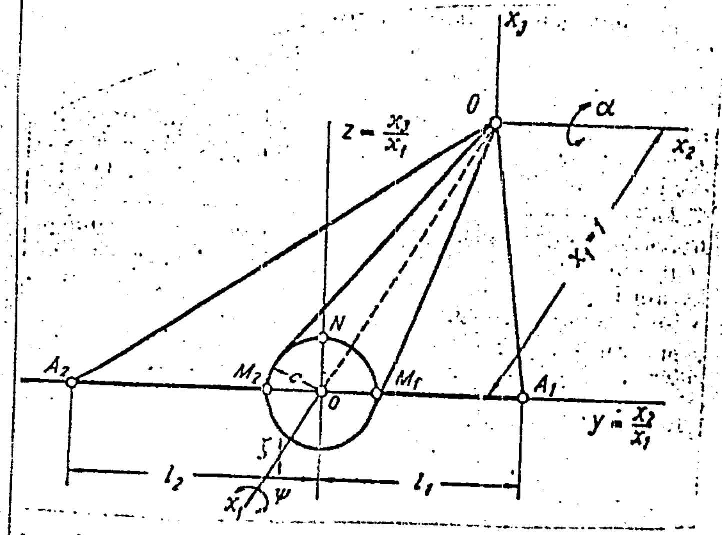

Fig. 1. Wing-conic body configuration

by the authors. The axial perturbation velocities for various positions of the leading edge of the wing with respect to the Mach cone were calculated, and an expression for the pressure coefficient in the cases of subsonic and supersonic

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ACC NR: AP6036267

leading edges was derived from these calculations. Orig. art. has: 3 figures and 60 formulas.

SUB CODE: 20/ SUBM DATE: 29Mar66/ ORIG REF: 006/ OTH REF: 001/
ATD PRESS: 5105

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APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000308010012-6"

ACC NR: AP7003247 SOURCE CODE: RU/0019/66/011/006/1365/1371

AUTHOR: Carafoli, Elie

ORG: none

TITLE: Application of quasi-conical motions to the theory of wings with curved leading edges

SOURCE: Rev roum scien techn. Ser mecan appl, v. 11, no. 6, 1966, 1365-1371

TOPIC TAGS: supersonic aerodynamics, delta wing, conic flow, thin wing, flow velocity, pressure coefficient

ABSTRACT:
This paper deals with application of the so-called quasi-conical motions to the theory of modern forms of aircraft wings. A detailed analysis based on the author's previous work (Revue Roumaine des Sciences Techniques-Mecanique Appliquee, v. 11, no. 6, 1965) concerning the quasi-conical potential of motion around wings with subsonic curved leading edges is presented. An expression is derived for the quasi-conical potential resulting from the conical potential corresponding to a wing with straight leading edges. Formulas are developed from this expression for the axial disturbance velocity and the pressure coefficient is deduced for a flat wing with subsonic curved leading edges. The results

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ACC NR: AP7003247

obtained here can be applied to wings of gothic shape employed in supersonic aerodynamics and the procedure may be extended to wings whose central body is of arbitrary shape, to cruciform wings, etc. Orig. art. has: 2 figures and 42 formulas.

SUB CODE: 20/ 01/ SUBM DATE: 05Apr66/ ORIG REF: 001/ ATD PRESS: 5112

Card 2/2

ACC NR: AP7003248 SOURCE CODE: RU/0019/66/011/006/1373/1386

AUTHOR: Carafoli, E.; Staicu, S.

ORG: [Carafoli] Institute of Fluid Mechanics, Academy of the Socialist Republic of Rumania; [Staicu] The "Gh. Gheorghin-Dej" Polytechnic Institute, Bucarest

TITLE: Antisymmetric thin delta wing with flow separation at the leading edges

SOURCE: Rev roum scien techn. Ser mecan appl, v. 11, no. 6, 1966, 1373-1386

TOPIC TAGS: supersonic aerodynamics, supersonic flow, delta wing, flow separation, vortex, conic flow, pressure distribution

ABSTRACT:
A supersonic flow around a thin antisymmetric delta wing whose two halves are at the same angle of attack but of opposite sign is considered, with flow separation taken into account. The effect of the flow separation at the subsonic leading edges on the flow pattern is investigated. This effect results in the occurrence of two concentrated vortex nuclei of the same intensity and sign having, however, antisymmetric position with respect to the axis of symmetry of the wing (see Fig. 1).

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ACC NR: AP7003248

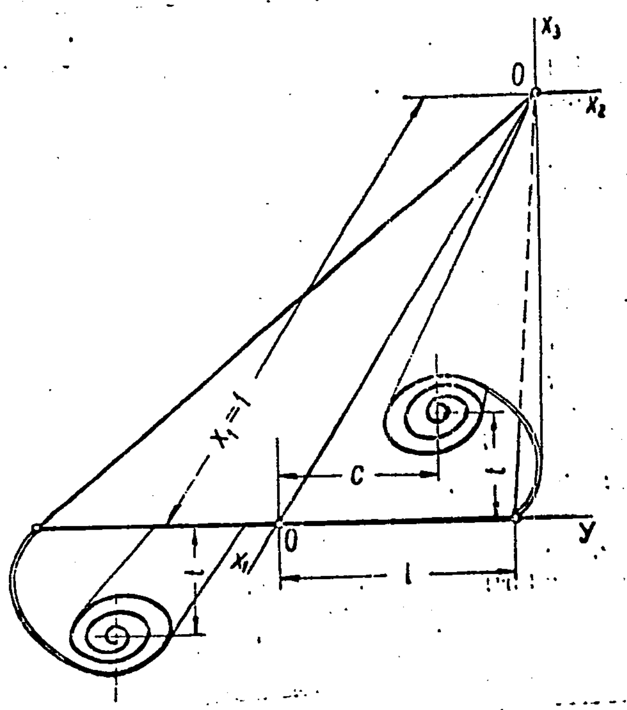

Fig. 1. Wing and flow configuration

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The formation of vortices induces a complex field of downwashes which alters the flow in such a way that the pressures are finite at the edges. The distribution of downwashes leads to a system of three fictitious wings whose superposition yields a resultant fictitious wing which is equivalent, from the aerodynamic standpoint, to the real wing, for which the axial disturbance velocity has the expression: $U = U_e + U_t U_c$ and which will be antisymmetric with respect to the Ox_1-axis of symmetry and continuous at the origin O. Since the flow remains conical, the pressures on the upper and lower surfaces of the wing and also the aerodynamic characteristics may be determined. Pressure distributions for various wings and different angles of attack at $M_\infty = 1.9$ and the variation of the rolling moment coefficient in terms of the angle of attack and various parameters of slenderness of the wing are presented in graphs for the cases of distributed and concentrated sources. The simplified case of a concentrated source is also considered. Orig. art. has: 5 figures and 49 formulas.

SUB CODE: 20/ SUBM DATE: 29Jun66/ ORIG REF: 003/ OTH REF: 003/
ATD PRESS: 5112

Card 3/3

CARAGEA, Ion

How the trade-union committees execute their jurisdictional attributions. Munca sindic 6 no.6:35-37 Je '62.

1. Presedinte al comitetului sindicatului Fabricii de mase plastice, Bucuresti

CARAIANI, L.

Calculus of Seepage Through Jetties of Homogenous Earth in Unstationery Regime. Hidrotehnica (Hydrotechnology), #4:170:Aug 57

S/081/62/000/003/062/090
B149/B101

AUTHORS: Creanga, C., Caraiani, V.

TITLE: Rumanian petroleum. 3. Petroleum of Moinesti-Gazlau-Foale

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1962, 432, abstract 3M128 (Bol. Inst. petrol, gaze si geol. v. 6, 1960, 225 - 246)

TEXT: General chemical characteristics and the chemical composition of petroleum fractions from the Moldova region have been investigated. The petroleum has a high paraffin content and is heavy because of the high content of tar and aromatic compounds. The petroleum contains 0.4 - 0.7% of sulfur. The light fractions are characterized by an excess of aromatic hydrocarbons and mainly contain naphthenes and paraffins in equal ratios. The heavy fractions consist mainly of paraffins, but at the same time possess aromatic characteristics. The petroleum investigated belongs to the paraffin-naphthene-aromatic class. 2nd communication see RZhKhim., 1961, 19M134. [Abstracter's note: Complete translation.]

Card 1/1

CREANGA, C.; DIMITRESCU, F.; NEGRESCU, V.; CARAIANI, V.; NEACSU, P.; RADULESCU, S.

Rumanian crude oil in the "Carpatica" classification.
Rev chimie 7 no. 1: 111-125 '62.

1. Chaire de Chimie du Petrole Institut de Petrole, de Gaz et de Geologie Bucarest.

CARAIANI, V.; LERESCU, C.; CREANGA, C.

Cyclohexane hydrocarbons in the lower fractions of some Rumanian crude oils in Muntenia and Moldavia. Bul Inst Petrol Rum no. 10:83-96 '63.

ALEXANDRESCU, I., ing.; CARAIMAN, Gh., ing.

New technological method in pisculture, the early reproduction of carp. Ind alim anim 11 no.2: 46-49 F'63

1. Directia generala a industriei pestelui.

CARAION, F.

Marine Ostracoda of the Rumanian waters of the Black Sea. p. 89.

HIDROBIOLOGIA. (Academia Republici Populare Romine. Comisie de Hidrologie, Hidrobiologie si Ihtiologie) Bucuresti, Rumania. Vol. 1, 1958.

Monthly list of East European Accessions (EEAI) LC, Vol. 8, no. 8, Aug. 1959

Uncl.

KARAYON, Franchiska Yelena[Caraion, Francisca Elena]

New species of Ostracoda mussel in the Black Sea (Bosporus waters).
Rev biol 5 no.1/2:119-126 '60. (EEAI 10:9)

(Black Sea) (Ostracoda)

CARAION, Francisca Elena

Loxoconcha bulgarica n.sp., a new ostracod collected in the Bulgarian waters of the Black Sea (Sozopol). Rev biol 5 no.3:249-254 '60. (EEAI 10:4)

(RUMANIA--LOXOCONCHA)

CARAION, Francisca-Elena

New Cytheridae (Crustacea-Ostracoda) for the Pontic fauna of Rumania. Studii cerc biol anim 14 no.1:111-121 '62.

1. Comunicare prezentata de M. A. Ionescu, membru corespondent al Academiei R.P.R., membru al Comitetului de redactie si redactor responsabil, "Studii si cercetari de biologie; Seria biologie animala."

KARAYON, Franchiska Yelena [Caraion, Francisca Elena]

Some special problems related to the present state of the studies of Ostracodain in the Azov-Black Sea Basin. Rev biol 7 no.3:437-449 '62.

1. Institut biologii im. Tr. Sevulesku, Laboratoriya po okeanologii Akademii RNR.

CARAION, Francisca Elena

Contributions to the knowledge of Petricola and Ostracoda fauna along the Rumanian littoral (Agigea and Mangalia). Studii cerc biol anim 15 no.1:45-63 '63.

CARAION, Francisca Elena

New representatives of the Cytheridae (Ostracoda - Podocopa) family originating from the Rumanian Pontic waters. Studii cerc biol anim 15 no.3:319-331 '63.

1. Communicare prezentata de M.A. Ionescu, membru corespondent al Academie R.P.R.

CARAION, Francisca Elena

Observations on the Ostracoda in the briny water and supersaline basins of the Rumanian Black Sea littoral. Studii cerc biol s. zool 16 no. 4:271-281 '64.

1. Laboractry of Animal Taxonomy, "Traian Savulescu" Institute of Biology.

COMANESCU, T., ing.; CARAMAN, A., ing.

Criteria for the tariffing of electric power as reflected in the policy of development of oil and chemical industries, in Rumania. Petrol si gaze 13 no.7:321-325 Jl '62.

CARAMAN, E., prof. inv. mediu (Bucuresti)

Application of the residue theorem. Gaz mat fiz 14 no.7: 352-358 Jl '62.

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CATALIN, E., ing.; CARACAL, A., ing.; SERBAN, M. ing.

Electrification of petroleum refineries and the technical and economic effects of this substitution of the energy carrier agent. Petrol si gaze 15 no.1:24-29 Ja '64

CARAMAN, Paul, ing.

Economic efficacity in directing railroad cars according to the polygon law. Rev cailor fer 11 no.9:487-490 S '63.

1. Directia regionala Timisoara.

Contributions to the Study of Families of Isothermic Hypersurfaces Geodesically Parallel (Isometric)

Caraman, Petru. Contributions à l'étude des familles d'hypersurfaces isothermes géodésiquement parallèles (isoparamétriques). Acad. R. P. Romîne. Fil. Iaşi. Stud. Cerc. Şti. Mat. 8 (1957), no. 2, 191–208. (Romanian. Russian and French summaries)

A family of hypersurfaces $f(u^1, u^2, \cdots, u^n)$=const in a Riemannian space R_n is called isoparametric if it satisfies the relations $\Delta_1 f = g(f)$ and $\Delta_2 f = h(f)$, where Δ_1 and Δ_2 are Beltrami's first and second differential parameters of R_n. These hypersurfaces have been studied by Levi-Civita [Atti Accad. Naz. Lincei. Rend. Cl. Sci. Fis. Mat. Nat. 26 (1937), 355–362] and B. Segre [ibid. 27 (1938), 203–207] in the case of euclidean spaces and by E. Cartan [Math. Z. 45 (1939), 335–367] in the case of Riemannian spaces of constant curvature.

In the present paper the author shows that the hypersurfaces in R_n which are isothermic for the steady-state and geodesically parallel are identical with the family of isoparametric hypersurfaces in R_n.

There follow a number of theorems concerning, mainly, families of isoparametric hypersurfaces in Riemannian spaces of constant curvature which are at the same time Lamé families (i.e., they are part of an n-tuply orthogonal system of hypersurfaces in R_n).

The paper concludes with the consideration of a number of particular cases of R_3's which admit families of isoparametric surfaces.

R. Blum (Saskatoon, Sask.)

2

1-FW

CARAMAN, Petru

The theory of the n-dimensional quasi-conformal representations.
Rev math pures 6 no.2:311-356 '61.

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Theory of n-dimensional quasi-conformal representations. Studii mat Iasi 12 no.1:13-52 '61.

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The property N cf the n-dimensional quasi-conformal representations. Studii mat Iasi 12 no.2: 227-248 '61.

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Jacobi's method and the dilatations of n-dimensional quasi-conformal representations. Studii mat Iasi 13 no.1:61-86 '62.

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Existence theorems of n-dimensional quasiconformal representations. Studii mat Iasi 13 no.2:291-296 '62.

CARAMAN, Petru

On N properties of n-dimensional continuous representations. Studii mat Iasi 13 no.2:297-306 '62.

CARAMAN, P.

On the n-dimensional quasi-conformal representations. Studii mat Iasi 14 no.1:91-126 '63.