EYDEL'MAN, M.I.; LEMPERT, V.M.

Anticorrosion protection of molds made from aluminum alloys.
Tekst. prom. 23 no.7:54-55 Jl '63. (MIRA 16:8)

1. Nachal'nik proizvodstvenno-tekhnicheskogo otdela Chernovitskogo chulochnogo kombinata (for Eydel'man). 2. Starshiy inzhener proizvodstvenno-tekhnicheskogo otdela Chernovitskogo chulochnogo kombinata (for Lempert).
(Textile machinery) (Aluminum—Corrosion)

EYDEL'MAN, M.M.

New exhibits at the "Machine Tools and Cutting Tools" section. Inform. biul. VDNKH no.7:5-6 Jl '63. (MIRA 16:8)

1. Starshiy ekskursovod pavil'ona "Mashinostroyeniye" na Vystavke dostizheniy narodnogo khozoaystva.

DOMINSKAYA, G. EYDEL'MAN, M.

Exhibitions of special items. Inform. biul. VDNKH no.10:11-13 O '64 (MIRA 18:1)

1. Glavnyy metodist po tekstil'noy promyshlennosti pavil'ona "Legkaya promyshlennost'" (for Dominskaya). 2. Starshiy ekskursovod pavil'ona "Mashinostroyeniye" na Vystavke dostizheniy narodnogo khozyaystva SSSR (for Eydel'man).

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

1/2

**Influence of technological processes in the preparation of sour cabbages on the preservation of vitamin C. I. Distribution of vitamin C in the cabbage head.** M. M. Fidelman and R. I. Povrenna. *Voprosui Pitaniya* 3, No. 6, 18-21(1934).—Vitamin C is unevenly distributed throughout the different parts of the cabbage, the stalk contg. more than the outer leaves. II. **Reversible oxidation of vitamin C in cut cabbages.** M. M. Fidelman and M. L. Butom. *Ibid.* 21-5.—Partly reversible oxidation occurs in minced cabbage on keeping. The process is favored by an atm. of $CO_2$ or by treatment with $H_2S$, which allows formation of a completely reversible system.

B. C. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

BC

a-4

Determination of vitamin-C and the influence of technological treatment on its preservation in cabbage. S. O. Vinokurov, M. M. Eidelman, and M. L. [illegible] (Kharkov State Med. Inst. Jubilee J., 1935, 143—[illegible]).—Food extracts should always be treated with $H_2S$ before titration with indophenol in vitamin-C determinations. 40—70% of the C content passed into $H_2O$ when cabbage was cooked for 30 min. Cooking for longer periods involved heavy losses of C.

Nutr. Abs. (m)

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

11Q

Yeast as a means for the stabilization of ascorbic acid. M. M. Khlel'man. *Voprosy Pitaniya* 6, No. 5, 55-63(in English 63)(1937).—When cabbage was heated in water contg. 0.10–1.13 g. bakers' yeast per mg. of ascorbic acid (I) a preservation of 55–100% (av. 79%) of I was observed while only 17–73% (av. 48%) of I was preserved when no yeast was used. Since yeast loses its stabilizing capacity upon heating, the effect of stabilization of I cannot be entirely due to glutathione, the amt. of which is not reduced on heating. Expts. with cabbage juice contg. dehydroascorbic acid showed that the stabilizing effect of yeast depends on its reducing action with respect to the reversibly oxidized form of vitamin C.

S. A. Karjala

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

11E

**The stability of dehydroascorbic acid to heat.** M. M. Eidel'man. *J. Physiol.* (U. S. S. R.) 22, 682-8(in English 688)(1937).—The ascorbic acid (I) of decitrified and boiled lemon, orange and tangerine juices is transformed by the action of $I_2$, 2,6-dichlorophenolindophenol (II) or the hexoxidase (III) of cabbage leaves into the reversibly oxidized form, which is destroyed considerably more rapidly under the influence of heat than is reduced I. The $I_2$ oxidation of tangerine juice, followed by heating for 10 min., resulted in a loss of all but 15% of the original quantity, while in the controls it was preserved to 73%. After treatment with II 28%, and with III, 39% remained. All the I of cabbage, potatoes, carrots and apples exists in the reversibly oxidized form and after heating about 70% is irreversibly oxidized. Preliminary reduction of the juice results in the preservation of 64-92% of I after heating. The oxidation of plant juices by air in the presence of Cu, even after heating on a boiling water bath, results only in reversible oxidation. Technological processes causing a reversible oxidation of I lower its stability considerably.

S. A. Karjala

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

CE

**Stability of ascorbic acid in some acids.** M. M. Ekkel'man. *Biochem. J.* (Ukraine) 13, 715-29 (in Russian, 729-30; in English, 731-2) (1939); cf. *C. A.* 32, 6000[8], 9105[4].—$HPO_3$ has the best stabilizing effect on the ascorbic acid (I) extd. from plant and animal tissues, but the pptn. of the proteins is not complete; they cause excessive foaming with $CO_2$ or $H_2S$ and form stable adsorption products with the latter. $CCl_3CO_2H$ oxidizes I. Best results were obtained with 2% $HPO_3$ and 4% $CCl_3CO_2H$. The stabilizing influence of other acids was investigated. With 0.01 mg. Cu per 100 cc. of 3-4% I, 0.15 *N* $H_2SO_4$ is best. In the presence of $CCl_3CO_2H$, HCl is best. Cu retards the decompn. of I by $CCl_3CO_2H$. The protective influence of HCl is confirmed in expts. with tissues. The most stable I is in the brain, keeping for 4 hrs., while that of the liver keeps only 2 hrs. In the extn. of I it is possible to replace $HPO_3$ with 0.15 *N* HCl and 4% $CCl_3CO_2H$ or to reduce the concn. of $HPO_3$ to only 0.002%, with 4% $CCl_3CO_2H$.

Boris Gutoff

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

11D

**Effect of adrenaline on some biochemical transformations of the carbohydrates in muscle tissue.** M. M. Eldelman. *Biokhimiya* 5, 658-70(1940).—Extd. (with aq. $NaHCO_3$-KCl) frog, rabbit and dog skeletal muscle, and dog heart muscle retain some bound glycogen and an enzyme able to convert it into reducing substances. Lactic acid and hexose monophosphate are not formed in this process. The desmoglycogen in rabbit skeletal muscle is more resistant to salivary amylase than that of frog and dog skeletal and dog heart muscle. Adrenaline stimulates formation of reducing substances in washed frog muscle by salivary amylase, but does not affect its action on free glycogen or starch. Adrenaline inhibits hydrolysis of added glycogen by the bound enzyme of washed frog muscle. Adrenaline stimulates the enzyme if previously inhibited, or inhibits the enzyme if it has been activated by tissue autolysis.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Ca

11E

**Stability of dehydroascorbic acid in certain acids.** M. M. Kidel'man. *Biochem. J.* (Ukraine) **16**, 411-19(in Russian, 420; in English, 421)(1940); cf. *C. A.* **34**, 4771[e].—Trichloroacetic acid (I) destroys 60-81% of synthetic dehydroascorbic acid (II), obtained by oxidation of ascorbic acid with I, in 24 hrs. at 17-20°; and 40-50% of the natural (III) in cabbage juice. $HPO_3$ (IV) and HCl do not preserve II and III from the destructive action of I, IV alone preserves, 65-100%; HCl has the same action as I. $H_2SO_4$ and citric acid destroy II and somewhat less III. The stability of II is greater in aq. soln. than in acid; the opposite is true of III. Uric acid, at pH 6.2 in phosphate buffer, preserves 30-80% of II, and 30-48% of III. The detg. factor is the type of acid and not the pH.

B. Gutoff

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

VH

ca

**Vitamin C content in tissues of test animals after benzene poisoning.** R. I. Yaroslavskaya, M. M. Eidel'man, and F. Ya. Gordon. *Farmakol. i Toksikol.* 10, No. 3, 43-7(1947).—Tests with 11 frogs (against 27 controls) and 13 guinea pigs (12 controls) under subacute, acute, and chronic benzene (I) poisoning revealed no specific antagonism of I to ascorbic acid (II). Frogs poisoned with I (2 mg./kg.) showed no significant rise or fall of II in brain, liver, kidneys, skeletal muscle, intestines, or skin; but II rose from 3.3 to 10.4 mg. % in the adrenal glands. Given II (dose not stated) and tested 1, 2, 3, and 24 hrs. after poisoning with I, all frog tissues contained more II at 1 hr., but not all at 24 hrs. The cause of the increase is not known. Guinea pigs on a scorbutogenic diet (2.4 mg. II daily) were given a supplementary dose of II (20) mg./kg.) and poisoned with I (1 mg./kg. daily for 8-15 days). Liver, spleen, brain, adrenal gland, kidney, small intestine, skeletal muscle, heart, and skin were assayed for II. The oxidation-reduction balance between II and dehydroascorbic acid (III) in the liver revealed moderate activation of reduction (III to II) but not of oxidation (II to III). Poisoning with I raised the content of II somewhat in nearly all the tissues. These results do not contraindicate incidental therapeutic use of II while treating patients for poisoning with I. Julian F. Smith

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

11-f

**Bound ascorbic acid in blood.** M. M. Ikkel'man and F. Ya. Gordon. *Biokhimiya* 14, 58-61(1949). The bound ascorbic acid (I) in the blood is pptd. along with the proteins on the addn. of $(NH_4)_2SO_4$. The I is liberated from the bound form by subjecting the blood to autolysis at 37° for 30-40 min. The method of Deeny and Murdock (C.A. 36, 7062) which consists of treating the blood with CO followed by pptn. with $HPO_3$, gives both free and bound I. A rough measure of the bound I is obtained by subtracting from this value the amt. of I found after salting out with $(NH_4)_2SO_4$. The detn. of bound I by autolysis is regarded as more accurate. A considerable portion of I added to blood in vitro becomes immediately bound. Addn. of adrenaline to blood liberates the bound I. H. Priestley

Biochem. Lab., Ukr. Inst. Experimental Endocrinology, Kharkov

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

EYDEL'MAN, M.M.

USSR

Absorption of ascorbic acid by the blood as an index of the degree of its saturation with vitamin C in man. M. M. Eidel'man (Ukrain. Inst. Endocrinol., Kharkov). Ukrain. Biokhim. Zhur. 26, 310-22(1954).—In the pptn. of whole blood with $(NH_4)_2SO_4$ no splitting off of the globulins occurs and ascorbic acid can be estd. By making *in vitro* detns. for ascorbic acid before and after its *per os* administration, information can be secured regarding the degree of its satn. in the blood *in vivo*. C-hypovitaminosis can thus be detected by analyzing the blood, plasma, and urine in cases of obliterating endarteritis and occult infectious processes which remain undetectable by any of the heretofore employed analytical procedures. Satn. of the blood with ascorbic acid is accompanied by changes in the content of adrenaline and adrenaline-like substances. In low blood levels of these substances this may not hold in normal humans in such diseases as hypertonicity, thyrotoxicosis and the like. As therapy progresses favorably, such blood level relations return to normal. B. S. Levine

FRUMIN, Z., doktor meditsinskikh nauk (Moskva); EYDEL'MAN, M., kandidat biologicheskikh nauk (Khar'kov).

A new textbook ("The physiology of nutrition." A.M.Breitburg. Reviewed by Z.Frumin and M.Eidel'man). Sov.torg. no.10:40-41 O '56. (MLRA 9:12)

(Nutrition) (Breitburg, A.M.)

EYDEL'MAN, M.M.

A simple test to demonstrate some peculiarities of ascorbic acid excretion in various diseases. M. M. Eidel'man (Ukrain. Inst. Exptl. Endocrinol., Kharkov). *Laboratornoe Delo* **11**, No. 3, 7-8(1950).—The method is a simplification of Widenbauer's loading technique. The urine is collected in the morning following the ingestion of vitamin C the previous evening. The urine is collected in a jar contg. a few drops of concd. HCl. The vitamin C is detd. by titrating 0.1-0.05 cc. of 0.001 *N* 2,6-dichloroindophenol with the urine. If the indicator is decolorized by 1-2 drops of urine the latter is dild. until no more than 0.2-0.4 cc. is required for titration. If the urine contains very little vitamin C, a 5-times diln. is sufficient. Preliminary treatment of the urine specimen with Pb acetate or other reagents tending to render the test more specific are not necessary since the diagnostic value is due to the difference between the quantity of vitamin C present before and after ingestion.

A. S. Mirkin

Med 1

EYDEL'MAN, M.M.

Changes in the ability of the blood colloids to take up ascorbic acid in [illegible]

Pitaniye 15, [illegible]

(I) disappearing after addn. to blood followed by pptn. with $(NH_4)_2SO_4$ was used as an index of the adsorptive power of blood colloids for I. In guinea pigs the adsorptive power of blood colloids for I increased during hypovitaminosis.

E. Wierzbicki

EYDEL'MAN, M.M. (Khar'kov)

Effect of certain regulatory factors on indicators of adrenalin and ascorbic acid metabolism. [with summary in English]. Probl. endok. i gorm. 4 no.1:29-45 Ja-F'58 (MIRA 11:5)

1. Iz otdela biokhimii (zav. - chlen-korrespondent AN USSR prof. A.M. Utevskiy) Ukrainskogo instituta eksperimental'noy endorinologii (dir. - kand.med.nauk S.V. Maksimov)

(VITAMIN C, metabolism
adrenal cortex, eff. of factors influencing adrenal growth (Rus))
(ADRENAL CORTEX, metabolism
vitamin C, eff. of factors influencing adrenal growth (Rus))
EPINEPHRINE, metabolism,
eff. of factors influencing adrenal growth (Rus))

EYDEL'MAN, M.M., Doc Biol Sci -- (diss) "On ~~Concerning~~ the interaction between ~~of~~ adrenalin and ascorbic acid in certain physiological and pathological states of the animal organism." Khar'kov, 1959, 26 pp (Khar'kov Vet Inst) 300 copies (KL, 36-59, 113)

EYDEL'MAN, M.M.

Study of the regulation of ascorbic acid metabolism. Vitaminy no.4:53-59 '59. (MIRA 12:9)

1. Otdel biokhimii Ukrainskogo instituta eksperimental'noy endokrinologii, Khar'kov.
(ASCORBIC ACID)

UTEVSKIY, A.M.; BARTS, M.P.; BUTOM, M.L.; GAYSINSKAYA, M.Yu.; OSINSKAYA, V.O.; TSUKERNIK, A.V.; EYDEL'MAN, M.M.

Research on neural regulation of the metabolism of adrenaline and adrenalinelike substances. Sbor. nauch. trud. Ukr. nauch.-issl. inst. eksper. endok. 15:62-72 '59. (MIRA 14:11)
(ADRENALINE IN THE BODY) (NERVOUS SYSTEM)

EYDELMAN, M. M. (USSR).

Bound Ascorbic Acid in the Blood.

report presented at the 5th Int'l.
Biochemistry Congress, Moscow, 10-16 Aug. 1961

TURUBINER, N.M.; EIDEL'MAN, M.M.

Some biochemical indicators of receptive influences of the adrenal glands. Probl.endok.i gorm. 7 no.2:6-13 '61. (MIRA 14:5)
(ADRENAL GLANDS) (ADRENALINE) (ASCORBIC ACID)

EYDEL'MAN, M. R.

| | | |
|---|---|---|
| Country | : USSR | F |
| Category | : Microbiology-Microbes Pathogenic for Man and Animal | |
| Abs. Jour | : Ref ... - Biol., ..., 1..., ...2 | |
| Author | : Eydel'man, M.R.; ...rinberg, G.I. | |
| Institut. | : | |
| Title | : Evaluation of the Role of the Carrier State in the Growth of the Epidemic Process in Dysentery | |
| Orig Pub. | : Vrachebn. Delo, 1957, No.7, 709-712 | |

Abstract : In systematic studies (of 143,489 persons), "healthy" carriers of dysentery bacilli among adults comprised 0.7% of cases, 0.58% among children, which exceeded by 21 times the percentage of the carriers of typhoid-paratyphoid bacilli. Among those having recovered from dysentery, the carrier state was detected in 2.3%, and among those in contact with the patients, in 2.6% of cases. The relationship among the species of dysentery bacilli in the carriers did not differ from that seen in patients with the disease. - A.M.Shibayeva

Card: 1/1

Clinic infectious diseases, Odessa Med. Inst, and Voroshilov rayon

EYDEL'MAN, M.R., kand.ekon.nauk, red.; USTIYANTS, V.A., red.; KAPRALOVA, A.A., tekhn.red.

[Manual on the divisions of statistics; statistics of population; health; culture; housing and communal economy; budgets of workers, employees and collective farmers; commerce; state purchases; capital construction; automotive transportation; accounting in village soviets] Uchebnoe posobie po otdel'nym otrasliam statistiki; statistika naseleniia, zdravookhraneniia, kul'tury, zhilishchnogo i kommunal'nogo khoziaistva, biudzhetov rabochikh, sluzhashchikh i kolkhoznikov, torgovli, zagotovok, kapital'nogo stroitel'stva, avtotransporta i pokhoziaistvennyi uchet v sel'sovetakh. Moskva, Gos.stat.izd-vo, 1958. 406 p. (MIRA 11:5)
(Statistics)

EYDEL'MAN, M. R.; GRINFEL'D, A. A.; NIKOLAYEVA, V. L.; MAKAROCHKINA, V. I.; SOTNICHINKO, L. A.

"Data on the healthy carrier of dysentery."

Report submitted at the 13th All-Union Congress of Hygienists, Epidemiologists and Infectionists. 1959

PETROV, A.I., prof.; LESHCHINSKIY, M.I., kand. ekon. nauk; MAKSIMOVA, V.N., dotsent; MALYY, I.G., dotsent; MOSKVIN, P.M., dotsent; TITEL'BAUM, N.P., dotsent; URINSON, M.S., dotsent; EYDEL'MAN, M.R., kand. ekon. nauk; GUREVICH, S.M., red.; GRYAZNOV, V.I., red.; PYATAKOVA, N.D., tekhn. red.

[Course in economic statistics] Kurs ekonomicheskoi statistiki. Izd.3., dop. i perer. Moskva, Gosstatizdat TsSU SSSR, 1961. 507 p. (MIRA 14:6)

(Statistics)

LOKSHIN, E.Yu., doktor ekon. nauk, prof.; ANDREYEVA, O.I., kand. ekon. nauk; VOROSHILOVA, T.S., kand. ekon. nauk, dots.; TARAS'YANTS, R.B., kand. ekon. nauk, dots.; FASOLYAK, N.D., kand. ekon. nauk, dots.; EYDEL'MAN, M.R., kand. ekon. nauk; YAKOBI, A.A., kand. ekon. nauk, dots.; TYAGAY, Ye., red.; MUKHIN, Yu., tekhn. red.

[Economics of the supply of materials and equipment] Ekonomika material'no-tekhnicheskogo snabzheniia; uchebnoe posobie. 2., perer. i dop. izd. Moskva, Gospolitizdat, 1953. 510 p. (Industrial procurement) (MIRA 16:7)

FREYMUNDT, Ye.N., dots.; KORENEVSKAYA, N.N., dots.; IL'CHENKO, S.P; SAMOYLOVA, A.A., dots.;GUROV, G.M., dots.; IVANOV, Yu.M.; ZAYTSEVA, N.V., dots.;EYDEL'MAN, M.R., red.; KONIKOV, L.A., red.; PONOMAREVA, A.A., tekhn. red.

[Balance of the gross national product of a Union Republic; problems in the theory and methodology of its preparation] Balans obshchestvennogo produkta soiuznoi respubliki; voprosy teorii i metodiki sostavleniia. Moskva, Ekonomizdat, 1962. 326 p. (MIRA 16:4)

1. Moscow. Ekonomiko-statisticheskiy institut.
(Gross national product)

EYDEL'MAN, M. R.

Statistika material'nogo snabzheniia [Statistics on the supply of materials]. Gosstatizdat, 1953, 224 p.

SO: Monthly List of Russian Accessions, Vol. 7 No. 1 April 1954.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041231(

Eydel'man, M.

2-1-4/9

AUTHOR: Eydel'man, M.

TITLE: On the Computation of the Social Product and National Income in the Union Republics (Ob ischislenii obshchestvennogo produkta i natsional'nogo dokhoda v soyuznykh respublikakh)

PERIODICAL: Vestnik Statistiki, 1958, # 1, p 43-55 (USSR)

ABSTRACT: The article shows how to obtain the indices enabling the statistician to compute the level, structure and production rates of the social product and national income, showing the economical development of every country. It is impossible to project any planning in a socialist economy without analyzing very carefully these indices.

The computation and analysis of these indices are particularly important during the present phase of the USSR economical development. The extended rights of the Union Republics, the changed structure of industrial and construction administration and the establishment of the sovnarkhozes demand a higher quality of economical work in the Union Republics and within the district economical administrations.

The methodology of computing the volume of the social product and national income within the Union Republics and the computation of total indices with respect to the whole country,

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On the Computation of the Social Product and National Income in the Union Republics

originate from the supposition that the social product and national income are formed by the different branches of material production, such as: industry, construction, agriculture, forestry, freight transport, communication enterprises, trade, public alimentation, material technical supplies, etc.

The author presents four tables showing how to compute some production figures:

1. The sequence of computational operations of the total volume of material expenses and the production expenses.

2. A general scheme of converting the material expenses into a joint cost.

3. A computation table showing how to obtain the net value of production from the material gross value of production expenditures.

4. A table for recalculation of costs into prices of 1956.

There are 4 tables.

AVAILABLE: Library of Congress

Card 2/2

SOV-2-58-8-6/12

AUTHOR: Eydel'man, M.

TITLE: From the History of the National Economy Balance Sheet of the USSR (Iz istorii balansa narodnogo khozyaystva SSSR)

PERIODICAL: Vestnik statistiki, 1958, Nr 8, pp 43 - 58 (USSR)

ABSTRACT: The necessity for compiling a balance sheet of the USSR national economy arises from the planning character of the socialistic society and the law of regular, proportional development of national economy inherent in socialism. The balance of accounts is a system of tables and indices giving an extensive characteristic of socialist reproduction on an enlarged scale. The balance is composed for one year and shows how, during the accounting period, the processes of production, distribution, consumption and accumulation were carried out. It also shows how the correlations and proportions between the individual branches and forms of property were brought about, how the national income was distributed for consumption and accumulation purposes, and how the processes of distribution and redistribution of the social product and national income and

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SOV-2-58-8-6/12

From the History of the National Economy Balance Sheet of the USSR

the forming of enterprise profits occurred. The author reviews the balance sheets for 1923, 1928, 1929 and 1930. He then shows how the work on the balance sheets has developed. The article contains a scheme of 14 different sections of the balance sheet. A standard specimen of one of the most important tables (the balance sheet of production, consumption and accumulation of the social product) is also given. An important condition for a good balance sheet is the scientifically developed classification of the branches of national economy and the establishment of exact limits between the productional and non-productional regions. These classifications have been steadily perfected. The author deals with the study of the balance sheet's basic indices, the working out of methods to

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SOV-2-58-8-6/12

From the History of the National Economy Balance Sheet of the USSR

ascertain the share of the individual branches of production in creating the social product and national income. He emphasizes that the computation of labor expenditure necessary for production was a complicated task, and outlines the participation of the statistical administrations of individual Soviet republics in compiling the balance sheet. In June 1957, a conference of statisticians discussed the question of methodology in compiling the national economy's balance sheet, and worked out a new scheme of basic tables which replaced the former ones of 1950. There are 2 tables and 1 Soviet reference.

Card 3/3

SOV/2-59-1-5/10

AUTHOR: Eydel'man, M.

TITLE: The Steady Rise in the Prosperity of the Soviet People(Neuklonnyy rost blagosostoyaniya sovetskogo naroda)

PERIODICAL: Vestnik statistiki, 1959, Nr 1, p 33 - 48 (USSR)

ABSTRACT: The author lists the advantages of the socialist type of production for raising the living standard of the population. He refers to the theses of N.S. Khrushchev's report to the 21st KPSS Congress, setting forth a program for a further fast and all-round rise in the living standard during 1959 to 1965. The article contains basic indices on the material welfare of the Soviet people during the forthcoming 7 years covering the national income, number of workmen and employees, industrial production of consumer goods, real wages of workmen and employees, etc. The

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The Steady Rise in the Prosperity of the Soviet People

author examines in detail these basic indices pointing out that in 1958, the national per capita income in the USSR, has increased 15 times as compared with 1913. During the forthcoming 7 years, the national income of the USSR must rise by 62 - 65%. The volume of consumption will increase by 60 to 63%. In 1965, the national income will exceed that of 1913 by 35 to 36 times. A table shows the rate of growth of the USSR national income from 1913 to 1958 as compared with the chief capitalist countries. The article also contains data on the increase in the real wages of workmen and employees, and the real income of farmers. It is pointed out that the regulating of wages of the low and medium paid workmen and employees, which started in recent years, will be continued during the next 7 years. It

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The Steady Rise in the Prosperity of the Soviet People

is planned to increase the wages of the low-paid workmen and employees from 270 - 350 to 500 - 600 rubles per month. The material welfare of the kolkhoz workers and the pension plans are also discussed. In 1966, it is intended to raise the minimum pensions in the cities to 450 - 500 rubles per month. The social insurance fund is composed of contributions from enterprises, administrations and organizations without any deductions from wages. The author deals with state social insurance in case of illness and pregnancy, and with the question of free medical service as important factors of the living standard of the population. One chapter is devoted to the increase in consumption of the most important food products, while the next one deals with the increase in production of articles of the food and light industry by 1965. A table shows the comparative per

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The Steady Rise in the Prosperity of the Soviet People

capita figures in the production of milk, butter and meat in the USA and USSR for 1958, the total output of the USSR, the output required to catch up with the USA and the total production in 1965. Some considerations are given to the problem of improving housing conditions. Towards the end of the 7-year plan, housing construction will have increased 1.6 times. Beginning with 1964, a gradual transfer of all workmen and employees to a 30 to 35 hour week is intended. The concluding chapter deals with the rise in the cultural level of the Soviet people. The number of students in schools of general education will increase in 1965 to 38 - 40 million in 1958. Four million other students will be trained in secondary special schools. The total number of specialists with higher education turned out from 1959 to 1965 will

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The Steady Rise in the Prosperity of the Soviet People

be 2.3 million against 1.7 million persons from 1952 to 1958. The reorganization of the school system will tend towards a closer contact between training and practical work, and the turning out of fully-educated people. The 7-year plan will establish conditions for a still faster development of all branches of science. There are 6 tables.

Card 5/5

NOVIKOV, V.S., prof., otv.red.; FREYMUNDT, Ye.N., dotsent, zam.otv.red.; RYABUSHKIN, T.V., prof., red.; EYDEL'MAN, M.R., kand.ekon.nauk, red.; MALYY, I.G., dotsent, red.; VASHENTSOVA, V.M., dotsent, red.; ZAYTSEVA, N.V., kand.ekon.nauk; SHENTSIS, Ye.M., red.; KAPRALOVA, A.A., tekhn.red.

[Problems in the balance of the economy of a Union Republic; concise stenographic record of an academic conference, January 25-27, 1960] Problemy balansa narodnogo khoziaistva soiuznoi respubliki; sokrashchennaia stenogramma nauchnoi konferentsii 25-27 ianvaria 1960 g. Moskva, Gosstatizdat, TsSU SSSR, 1960. 118 p. (MIRA 14:3)

1. Moscow. Ekonomiko-statisticheskiy institut. 2. Moskovskiy ekonomiko-statisticheskiy institut (for Novikov, Freymundt).
3. Institut ekonomiki Akademii nauk SSSR (for Ryabushkin).
4. TSentral'noye statisticheskoye upravleniye SSSR (for Eydel'man).
5. Moskovskiy gosudarstvennyy ekonomicheskiy institut (for Malyy).
(Russia--Economic policy) (Russia--Statistics)

LOKSHIN, E.Yu., prof., doktor ekon.nauk; ANDREYEVA, O.I., kand.ekon.nauk; VOROSHILOVA, T.S., dotsent, kand.ekon.nauk; TARAS'YANTS, dotsent, kand.ekon.nauk; FASOLYAK, N.D., dotsent, kand.ekon.nauk; EYDEL'MAN, M.R., kand.ekon.nauk; YAKOBI, A.A., dotsent, kand.ekon.nauk; PISKUNOV, V., red.; MUKHIN, Yu., tekhn.red.

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(Industrial procurement)

1. EYDEL'MAN, M. YA.

2. USSR (600)

4. Latvia - Fur Farming

7. Development of collective farm fur farming in the Latvian S.S.R. Kar i zver No. 6 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

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(Time study) (Labor productivity)

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EYDEL'MAN, R.A.

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[Manpower of the U.S.S.R.; problems in distribution and utilization] Trudovye resursy SSSR; problemy raspredeleniia i ispol'zovaniia. Pod red. N.I.Shishkina. Moskva,Izd-vo ekon.lit-ry, 1961. 243 p. (MIRA 14:12)

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1. Iz orgmetotdela (zav. - prof. S.G. Kagan) Ukrainskogo nauchno-issledovatel'skogo instituta tuberkuleza (dir. - dotsent A.S. Mamolat) i Chernigorvskogo oblastnogo protivotuberkuleznogo dispansera (glavnyy vrach L.Ya. Zamdborg).
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AKOL'ZIN, P.N.; ARAKEL'YANTS, N.M.; BUYANOVA, O.A.; KIRNOSOV, V.I.; KISELEVSKIY, S.L.; TARAPIN, V.N.; SHCHEDROVITSKIY, S.S.; EYDEL'MAN, R.Ya.

Unified series of strain gauges for the automation of construction and road machinery. Priborostroenie no.8:11-12 Ag '62. (MIRA 15:9)

(Strain gauges)

[illegible], [illegible]

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SO: SUM 186, 19 Aug 1954

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041231(

EYDEL'MAN, S.D. (Chernovtsy).

Solution estimates for parabolic systems, and some of their applications. Mat.sbor. 33 no.2:359-382 S-O '53. (MIRA 6:9)
(Matrixes) (Differential equations)

EYDEL'MAN, S.D.

USSR/Mathematics - Parabolic and elliptic systems FD-1023

Card 1/1 Pub. 64 3/9

Author : Eydel'man, S. D. (Chernovtsy)

Title : Relationship among the fundamental matrices of the solutions to parabolic and elliptic systems

Periodical : Mat. sbor., 35(77), No 1, 57-72, Jul-Aug 1954

Abstract : The author remarks that the fundamental matrix of the solutions for general linear elliptic systems was recently constructed by Y. B. Lopatinskiy in his article "Fundamental system of solutions to an elliptic system of linear differential equations ," Ukr. matem. zhurn., III, No 1 (1951), 3-38. In the present work the author establishes a very simple connection among the fundamental matrices of solutions to parabolic and elliptic systems. This work represents a continuation of the author's "Evaluations of the solutions to parabolic systems and some of their applications," Mat. sbor., 33(75) (1953), 359-382, which contains all the necessary definitions and designations. The relation of the fundamental solutions to the equation of heat conduction and to the Laplace equation with three independent variables has been studied by A. N. Tikhonov ("Equation of heat conduction for several variables," Byull. MGU, sektsiya A, I, No 9 (1938), 1-45).

Submitted : 4 March 1953

EYDEL'MAN, S.D.

USSR/ Mathematics - Cauchy's theorem

Card 1/1 : Pub. 22 - 8/44

Authors : Eydel'man, S. D.

Title : Cauchy's theorem (problem) for parabolic systems

Periodical : Dok. AN SSSR 98/6, 913-915, October 21, 1954

Abstract : The article deals with determination of criteria for the values of the main matrix of the solution of a parabolic system,

$$\frac{\partial u_i}{\partial t} = \sum_{j=1}^{N} \sum_{\Sigma k_s \leqslant 2b} A_{ij}^{(k_1 k_2 \dots k_n)}(t) \frac{\partial^{k_1+k_2+\dots+k_n}}{\partial x_1^{k_1} \partial x_2^{k_2} \dots \partial x_n^{k_n}}$$

(where $i = 1, 2, \dots, N$) and for their (values) use for proving the correct applicability (solvability) of Cauchy's theorem (problem) to the class of unlimited functions for parabolic systems with coefficients dependent on both time and space coordinates. Six references (1938-1953).

Institution : Chernovitsy State University

Presented by: Academician I. G. Petrovskiy, June 10, 1954

EYDEL'MAN, S.D.

USSR/Mathematics - Liouville's type theorems

Card 1/1 Pub. 22 - 4/56

Authors : Eidel'man, S. D.

Title : Theorems of Liouville's type theorem for parabolic and elliptical systems

Periodical : Dok. AN SSSR 99/5, 681-684, Dec 11, 1954

Abstract : A series of theorems of the Liouville type is proved for the purpose of using them as a method for the solution of systems of parabolic and elliptical equations. Three USSR references (1950-1953).

Institution : The Chernovitsy State University

Presented by: Academician S. L. Sobolev, September 23, 1954

EYDEL'MAN, S.D

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|---|---|---|---|
| SUBJECT | USSR/MATHEMATICS/Differential equations | CARD 1/2 | PG - 3 |
| AUTHOR | EJDEL'MAN S.D. | | |
| TITLE | On the analytic behavior of the solutions of parabolic systems. | | |
| PERIODICAL | Doklady Akad. Nauk 103, 27-30 (1955) reviewed 5/1956 | | |

By aid of his earlier result on the fundamental matrices of the solutions in the complex domain (Doklady Akad. Nauk 98, No.6 (1954)) the author extends the results of Petrovski (Bull. M.G.U. 1938) to linear parabolic systems

$$(1) \qquad \frac{\partial U}{\partial t} = A_0(t,x,\frac{\partial}{\partial x})\, U + A_1(t,x,\frac{\partial}{\partial x})\, U \equiv A(t,x,\frac{\partial}{\partial x})\, U,$$

where the elements of $A_0$ are differential operators of the order 2b and the elements of $A_1$ are of order not higher than 2b-1 and the coefficients are analytic functions of the space coordinates. The sketched proofs base on the fact that the fundamental matrix of the system with coefficients depending only on t belongs to the space $Z^q$ defined by Gel'fand and Šilov (Uspechi mat. Nauk 8, 6 (1953)), $q = \frac{2b}{2b-1}$. The principal lemma means that if 1) the coefficients of (1) are analytic functions of $x_1$ in a neighborhood $\mathcal{O}_1$ of the real point $t^o, x_1^o, \dots x_n^o$; $t^o < 0$ being complex in $x_1$ and real in the other variables,

Doklady Akad. Nauk 103, 27-30 (1955)

2) the coefficients of the system $\frac{\partial U}{\partial t} = A_0(t,y,\frac{\partial}{\partial x})U$ are continuous and bounded functions of y,t and have continuous and bounded derivatives relative to $y_1 \ldots y_n$ up to the order $r \geqslant 2b+1$ in the strip $\Pi\,(0 \leq t \leq T, -\infty < y_s < \infty)$, 3) in the elements of the operator $A_1(t,x,\frac{\partial}{\partial x})$ the coefficients possess derivatives of at least first order relative to $x_1,\ldots x_n$ being continuous and bounded in $\Pi$, then in $\Pi$ there exists the fundamental matrix $Z(t,T,x,\xi)$ which can be continued in the domain $\mathcal{G}_2 \subset \mathcal{G}_1$ being complex in $x_1$ such that there it is analytic.
By aid of this lemma it can be proved that if the coefficients of (1) satisfy the conditions 1)2)3) of the lemma, then every solution of (1) being regular in $\Pi$ and belonging to the function class $|U(x,t)| \leq M\, e^{k|x|^q}$ is an analytic function of $x_1$. With a regulary solution the author denotes a solution which is continuous together with its derivatives appearing in the system. For inhomogeneous parabolic systems correspondingly holds: If the coefficients satisfy certain conditions, then every solution satisfying the inhomogeneous system in a certain neighborhood can be continued into the complex such that there it becomes analytic.

INSTITUTION: Public University Cernovizy

Eydel'man, S. D.



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

Eydel'man, S. D. (L'vov). On the Method of Fundamental Solutions of the Theory of Parabolic Systems. 72-73

There are 4 references, all of them USSR.

Section of the Theory of Functions. 74-113

Reports of the Following personalities are included:

Avetisyan, A. E. (Yerevan). On Approximation of Function of Many Variables by Entire Functions. 74-75

Mention is made of Dzhrbashyan, M. M.

Al'per, S. Ya. (Rostov-na-Donu). On the Asymptomatic Values of the Best Approximation of Analytic Function in Complex Region. 75

Card 22/80

EYDEL'MAN, S.D

parabolic systems." Ukrain. Mat. Ž. 6

(Russian)

Les résultats de cet article sont pour l'essentiel contenus

SUBJECT USSR/MATHEMATICS/Integral equations CARD 1/2 PG - 708
AUTHOR EJDEL'MAN S.D.
TITLE On an integral equation with an irregular kernel.
PERIODICAL Uspechi mat.Nauk 11, 1, 235-239 (1956)
reviewed 4/1957

The author considers the integral equation

$$(1) \qquad \mu(t) + \frac{1}{2}\int_0^t \frac{k}{(t-\tau)^{3/2}}\, e^{\frac{ik^2}{4m(t-\tau)}}\, u(\tau)d\tau , \qquad (m>0),$$

from which he seeks a solution by proving at first the lemma 1: If $u(t)$ is a function which admits a continuous derivative of second order and if $u(0) = 0$, then the operator integral $A^{(m)}$, defined by

$$(2) \qquad A^{(m)}u = \frac{1}{2}\int_0^t \frac{k}{2\sqrt{m}\,(t-\tau)^{3/2}}\, e^{\frac{ik^2}{4m(t-\tau)}}\, u(\tau)d\tau, \qquad (m>0),$$

satisfies the relation:

(3) $$A^{(m)}A^{(n)} = A^{(n)}A^{(m)} = \frac{1}{2}A^{\left(\frac{nm}{(\sqrt{m}+\sqrt{n})^2}\right)}.$$

Writing the equation (1) in the form

(4) $$\mu(t) + 2A^{(1)}\mu = \varphi(t)$$

and by applying to (4) the iteration method, the author shows that the solution of (1) is given by

(5) $$\mu(t) = 2\sum_{n=1}^{\infty}(-1)^n A^{\left(\frac{1}{2}\right)}\varphi + \varphi(t).$$

Moreover this solution is unique.

EYDELMAN, S.D.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/2 PG - 399
AUTHOR EJDELMAN S.D.
TITLE The bahavior of the solutions of the heat conducting equation in the neighborhood of an isolated singularity.
PERIODICAL Uspechi mat. Nauk 11, 3, 207-210 (1956) reviewed 11/1956

The theorem on the behavior in the neighborhood of an isolated singularity is extended to the solutions of the heat conducting equation:

$$(1) \qquad \frac{\partial u}{\partial t} = \sum_{k=1}^{m} \frac{\partial^2 u}{\partial x_k^2} .$$

Let $u(x_1,x_2,x_3,t) = u(x,t)$ be a solution of (1) having an isolated singularity at the origin. We have

$$u(x,t) = \sum_{m=0}^{N-1} \sum_{m_1+m_2+m_3=m} a_{m_1 m_2 m_3} \frac{\partial^m U(x,t)}{\partial x_1^{m_1} \partial x_2^{m_2} \partial x_3^{m_3}} + u_0(x,t) \qquad \text{for } t>0$$

with $U(x,t) = \mathfrak{A}(x,t;0,0)$, where the function

$$\mathfrak{A}(x,t;\xi,\tau) = \left(2\sqrt{\pi(t-\tau)}\right)^{-3} \exp\left[-\frac{1}{4(t-\tau)} \sum_{k=1}^{m} (x_k-\xi_k)^2\right]$$

Uspechi mat. Nauk 11 3, 207-210 (1956) CARD 2/2 PG - 399

is a fundamental solution of (1). The function $u_c(x,t)$ is a solution of (1) being regular at the origin. The number N depends on the order of the singularity of the function $u(x,t)$. The theorem holds for an arbitrary number of independent variables. The author announces that he has proved an analogous theorem relative to parabolic systems (in the sense of Petrovskij) of an arbitrary order in the general form.

EYDEL'MAN, S.D.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/2 PG - 445
AUTHOR EIDEL'MAN S.D.
TITLE On fundamental solutions of parabolic systems.
PERIODICAL Mat. Sbornik, n. Ser. 38, 51-92 (1956)
reviewed 12/1956

The principal results of the present investigations have been published in an earlier paper (Doklady Akad. Nauk 97. 913-915 (1954)). The author considers parabolic systems

$$(1)\qquad \frac{\partial u_i}{\partial t} = \sum_{j=1}^{N} \sum_{\Sigma k_s \leq 2b} A_{ij}^{(k_1 k_2 \dots k_n)}(t,x) \frac{\partial^{k_1+k_2+\dots+k_n} u_j}{\partial x_1^{k_1} \partial x_2^{k_2} \dots \partial x_n^{k_n}} \qquad i=1,2,\dots N$$

or written in matrix form

$$(2)\qquad \frac{\partial U}{\partial t} = P\left(t, x, \frac{1}{2\pi i} \frac{\partial}{\partial x}\right) U .$$

He constructs the fundamental matrix of the solutions of (2) and investigates

~~EYDEL'MAN, S.D.~~ EYDEL'MAN, S.D

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|---|---|---|---|
| SUBJECT | USSR/MATHEMATICS/Differential equations | CARD 1/2 | PG - 653 |
| AUTHOR | EIDEL'MAN S.D., LIPKO B.Ja. | | |
| TITLE | On a theorem of Liouville's type. | | |
| PERIODICAL | Mat.Sbornik, n. Ser. 40, 273-280 (1956) reviewed 3/1957 | | |

The authors consider the parabolic system

$$(1) \qquad \frac{\partial U}{\partial t} = P_0(t,x,\frac{1}{2\pi i}\frac{\partial}{\partial x})U + P_1(t,x,\frac{1}{2\pi i}\frac{\partial}{\partial x})U,$$

where $P_0$ is a differential operator of order 2b, while the order of the differential operator $P_1$ is at most 2b-1. Besides it is assumed that the derivatives of Green's matrix $G_0(t,\tau,x-\xi,y)$ of the system satisfy certain estimations and that the coefficients of the system in the half space $t\leq T$ possess continuous and bounded derivatives up to a certain order. By estimation of the fundamental matrix $Z(t,\tau,x,\xi)$ constructed by Eidel'man (see: Doklady Akad.Nauk 97, 913-915 (1954)) and by aid of some ideas of Gel'fand and Šilov (Uspechi mat.Nauk 8, 6, 3-54 (1953)) the authors come to the following assertion: Every solution $U(x,t)$ being regular in $t\leq T$ of the parabolic system (1), which must satisfy all above mentioned conditions, vanishes identically if for it the inequation

Mat.Sbornik, n.Ser. 40, 273-280 (1956) CARD 2/2 PG - 653

$$\left|U(x,t)\right| \leqslant \psi(t)\, e^{k \sum_{s=1}^{n} x_s}$$

is satisfied. The function $\psi(t)$ is continuous in $t \leqslant T$ and must still satisfy a condition of increase.

INSTITUTION: Černovizy.

EYDEL'MAN S. D.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/1 PG - 792
AUTHOR EJDEL'MAN S.D.
TITLE Normal fundamental solution matrices of parabolic systems.
PERIODICAL Doklady Akad.Nauk 110, 523-526 (1956)
reviewed 5/1957

In his earlier investigations on the solvability of the Cauchy problem for the parabolic system

$$\frac{\partial u}{\partial t} = A_0(t,x,\frac{\partial}{\partial x})u + A_1(t,x,\frac{\partial}{\partial x})u \equiv A(t,x,\frac{\partial}{\partial x})u$$

the author constructed the normal fundamental solution matrix $Z(t,\tau,x,\xi)$ under the assumption that the coefficients satisfy certain conditions (smoothness, boundedness) in the strip $\{0 \leq t \leq T, -\infty < x_s < \infty\}$ with $s=1,2,\dots,n$ (Doklady Akad.Nauk 98, 6 (1954); ibid. 103, 1 (1955)). In the present paper the author constructs the solution matrix for a finite region of definition of the coefficients $\{0 \leq t \leq T, x \in D\}$. Under very numerous assumptions he succeeds in constructing a normal fundamental matrix which satisfies sufficient conditions of differentiability and certain estimations. Some similar questions are treated.

INSTITUTION: University Černovizy.

EJDEL'MAN, S.D.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/2 PG - 786
AUTHOR EJDEL'MAN S.D.
TITLE On regular and parabolic systems of partial differential equations.
PERIODICAL Uspechi mat.Nauk 12, 1 (1957) 254-257
reviewed 5/1957

The paper consists of two sections, one of which in essential was already published (Mat.Sbornik 38, 1,(1956) 51-92 and Doklady Akad.Nauk 110, 4 (1956)). The other section treats systems with coefficients which depend on the time. The consideration of the differential operators in the spaces $S_{\alpha A}^{\beta B}$ (see Gel'fand and Šilov, Doklady Akad.Nauk 102, 6 (1955)) permits the author , under certain conditions, to prove the uniqueness of the solution of the Cauchy problem for the equation

$$\frac{\partial u}{\partial t} = P(t, \frac{1}{2\pi i} \frac{\partial}{\partial x})u$$

(uniqueness in the class of functions $u(x,t)$ for which $|u(x,t)| \leq C_2 e^{k|x|^{p'_0}}$).

The author gives an example for systems being regular in the sense of Gel'fand-Šilov, which neither are parabolic nor hyperbolic. For the question of the analyticity of the solutions the following theorem is given:
If there exist real $\sigma_1, \ldots, \sigma_n$ ($\sigma_1 \neq 0$) such that the equation

EYDEL'MAN, S.D.

20-2-15/62

AUTHOR: Eydel'man, S.D.

TITLE: Some Theorems on the Stability of the Solutions of Parabolic Systems (Nekotoryye teoremy ob ustoychivosti resheniy parabolicheskikh sistem)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 2, pp. 253 - 255 (USSR)

ABSTRACT: The present paper reports on some theorems concerning the stability (in the sense of Lyapunov) of stable parabolic systems in the sense of I.G. Petrovskiy which are defined in the half space $t \geqslant 0$ and which in every strip [0, T] belong to the class E of the uniqueness of the solution of Cauchy's problem (Koshi's problem). In this connection $P_k(t,(1/i)d/dx)$ signifies a differential operator of the order k with coefficients continuous in the case of $t \geqslant 0$. These results are obtained by the study of Green's matrix (Grin's matrix) of the above-mentioned system in the half space $t \geqslant 0$. Some of the thus obtained criteria are direct generalization of the well-known theorem by A.M. Lyapunov for the partial differential equations of the parabolic type. The author here studies the problem of the stability of the trivial solution of this system.

Card 1/2

20-2-15/62

Some Theorems on the Stability of the Solutions of Parabolic Systems

The author gives altogether 2 definitions and 4 rather comprehensive theorems. There are 4 Slavic references.

ASSOCIATION: Chernovtsy State University (Chernovitskiy gosudarstvennyy universitet)

PRESENTED: February 14, 1957, by I.G. Petrovskiy, Academician

SUBMITTED: February 12, 1957

AVAILABLE: Library of Congress

Card 2/2

Eydel'man, S.D.

20-6-9/42

AUTHOR: EYDEL'MAN, S.D.

TITLE: On Cauchy's Problem for Non-Linear and Quasi-Linear Parabolic Systems (O zadache Koshi dlya lineynykh i kvazilineynykh parabolicheskikh sistem)

PERIODICAL: Doklady Akad.Nauk, SSSR. 1957, Vol. 116, Nr 6, pp. 930-932 (USSR)

ABSTRACT: The author considers non-linear systems

$$\frac{\partial u}{\partial t} = F\left(t,x,u,\dots,\frac{\partial^{2b}u}{\partial x_1^{k_1}\dots\partial x_n^{k_n}}\right),$$ quasi-linear systems

$$\frac{\partial u}{\partial t} = P_0\left(t,x,u,\dots,\frac{\partial^{m}n}{\partial x_1^{k_1}\dots\partial x_n^{k_n}},\frac{\partial}{\partial x}\right)u + F\left(t,x,u,\dots,\right.$$

$$\left.\dots,\frac{\partial^{m}n}{\partial x_1^{k_1}\dots\partial x_n^{k_n}}\right),\quad 0 \leqslant m \leqslant 2b-1,\quad P_0\left(t,x,y;\frac{\partial}{\partial x}\right)$$ a differen-

tial operator, and systems which differ few from linear systems

Card 1/2

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041231(

On Cauchy's Problem for Non-Linear and Quasi-Linear Parabolic Systems 20-6-9/42

$$\frac{\partial u}{\partial t} = P_0(t,x;\frac{\partial}{\partial x})u + F(t,x,u,\dots,\frac{\partial^{2b-1}u}{\partial x_1^{k_1}\dots\partial x_n^{k_n}})$$ , which

altogether are supposed to be parabolic in Petrovski's sense. The correct solubility of Cauchy's problem is investigated. In all the three cases sufficient conditions are given for the existence of a certain correct solution. The proofs are based on the properties of the fundamental solution matrices of linear parabolic systems which recently were investigated by the author [Ref.2]. The present results of the author were already partially announced by him in 1956 on the Third Union Congress of Mathematicians. There are 2 Slavic references.

ASSOCIATION: Chernovtsy State University (Chernovitskiy gosudarstvennyy universitet)

PRESENTED: By I.G.Petrovskiy, Academician, May 15, 1957

SUBMITTED: May 9, 1957

AVAILABLE: Library of Congress

Card 2/2

EYDEL'MAN, S. D.: Doc Phys-Math Sci (diss) -- "Investigation of the theory of parabolic systems". Chernovtsy, 1958. 8 pp (Min Higher Educ USSR, Moscow Order of Lenin and Order of Labor Red Banner State U im M. V. Lomonosov), 150 copies (KL, No 5, 1959, 142)

SOV/42-13-4-9/11

AUTHOR: Eydel'man, S.D.

TITLE: On a Class of Regular Systems of Partial Differential Equations (Ob odnom klasse regulyarnykh sistem differentsial'nykh uravneniy v chastnykh proizvodnykh)

PERIODICAL: Uspekhi matematicheskikh nauk, 1958, Vol 13, Nr 4, pp 205-209 (USSR)

ABSTRACT: It is shown that the system

$$(1) \quad \frac{\partial}{\partial t}\left[\frac{\partial u}{\partial t} - P(t, \frac{1}{i}\frac{\partial}{\partial x})u\right] = R(t, \frac{1}{i}\frac{\partial}{\partial x})\, u,$$

where $\frac{\partial u}{\partial t} - P(t, \frac{1}{i}\frac{\partial}{\partial x}) = 0$ is a system parabolic in the sense of Petrovskiy [Ref 4] with $M = 2b$, $n_i = 1$ ($M$ - maximal order of differentiability with respect to $x_1,\dots,x_n$ in the operator $P$ and $2b$ - parabolic weight) and $R$ is an arbitrary operator with coefficients of at most 2b-th order continuous on $[0,T]$, is neither hyperbolic nor parabolic. At the same time, however, this system (1) is regular in the sense of Gel'fand and Shilov [Ref 1] and therewith it has a certain classical solution. To the class (1) there belongs e.g. the equation for the propagation of sound in a gas.
There are 7 Soviet references.

Card 1/2

On a Class of Regular Systems of Partial Differential Equations SOV/42-13-4-6/11

SUBMITTED: July 18, 1956

Card 2/2

39-44-4-3/5

AUTHOR: Eydel'man, S.D. (Chernovtsy)

TITLE: Liouville Theorems and Stability Theorems for Solutions of Parabolic Systems (Liuvillevy teoremy i teoremy ob ustoychivosti dlya resheniy parabolicheskikh sistem)

PERIODICAL: Matematicheskiy Sbornik, 1958, Vol 44, Nr 4, pp 481-508 (USSR)

ABSTRACT: The parabolic systems (1)

$$\frac{\partial^{n_i} u_i}{\partial t^{n_i}} = \sum_{j=1}^{N} \sum_{k_0 2b + \sum k_s \leqslant n_j 2b} A_{ij}^{(k_0 k_1 \dots k_n)}(t) \frac{\partial^{k_0+k_1+\dots+k_n} u_j}{\partial t^{k_0} \partial x_1^{k_1} \dots \partial x_n^{k_n}}$$

$$(i = 1,2,\dots,N)$$

$$(t \leqslant T \quad \text{or} \quad t \geqslant T)$$

in the sense of Petrovskiy are considered. Several former results of the author [Ref 12,13,14,15] are generalized.

§ 1. The consideration is based on estimations of Green's matrix $G(t,\tau,x)$ of (1). It is supposed that it satisfies one of the following conditions for all $t,\tau, t > \tau$, $x_1,\dots,x_n$ with

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$t \geqslant T$ or $t \leqslant T$ :

$$\Lambda_1 : \quad |D^m G(t,\tau,x)| \leqslant C_m \left[a(t,\tau)\right]^{K_m} e^{-c\left|\frac{x}{a}\right|^q}$$

$$\Lambda_2 : \quad |D^m G(t,\tau,x)| \leqslant C_m \left[a(t,\tau)\right]^{K_m} e^{-b(t,\tau) - c\left|\frac{x}{a}\right|^q}$$

where $a(t,\tau)$, $b(t,\tau)$ are continuous monotonely increasing functions of $t$, $a(\tau,\tau) = 0$, $b(\tau,\tau) = 0$ ; $C_m$, $c$ positive constants. The author gives several examples of classes of systems which satisfy the $\Lambda$ -conditions, e.g. strongly parabolic systems, certain systems the coefficients of which are constant or of bounded variation etc. § 2. Four Liouville theorems are proved, e.g.

Theorem: If for $t \leqslant T$ it holds the condition $\Lambda_1$, where for $\tau \to -\infty$ it tends $a(t,\tau) \to \infty$ and for $m \to \infty$ it tends $K_m \to -\infty$, then each solution of (1) regular in $t \leqslant T$ satisfying the condition

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Liouville Theorems and Stability Theorems for Solutions of Parabolic Systems 39-44-4-3/5

$$\left|\frac{\partial^k u_i}{\partial t^k}\right| \leqslant c\,[1 + |x|]^{\beta} \qquad (k = 0, 1, \dots, n_i - 1)$$

consists of a system of polynomials of at most $[\beta]$ -th degree.
If, however, in (1) it is $\sum_{s=1}^{n} k_s \geqslant 1$ and if $\beta < 1$, then the $u_i$ are constant.

Theorem: If for $t \leqslant T$ it holds $\Lambda_2$ with $m = 0$ and if a solution of (1) regular in $t \leqslant T$ satisfies the condition

$$|u(x,t)| \leqslant \varphi(t)\, e^{k|x|^{\mu}}, \quad 1 \leqslant \mu < q$$

$$\varphi(t_0)\, a(t,t_0)^{\frac{qn}{q-\mu} + K_0} \times \exp\left\{-b(t,t_0) + a(t,t_0)^{\frac{\mu q}{q-\mu}} \left(\frac{\mu\nu k}{cq}\right)^{\frac{\mu}{q-\mu}} \nu k \frac{q-\mu}{q}\right\} \xrightarrow[t_0 \to -\infty]{} 0$$

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where $\nu=1$ for $\mu=1$ and $\nu=2\mu$ for $\mu>1$, then the solution is identically equal to zero.
In the third paragraph the author shows that the considered properties of the solutions are closely connected with their stability. Three theorems referring to this are proved.
There are 21 references, 18 of which are Soviet, 1 French, and 2 American.

SUBMITTED: November 14, 1956

Card 4/4

20-120-5-14/67

AUTHOR: Eydel'man, S.D.

TITLE: Fundamental Matrices of the Solutions of General Parabolic Systems (Fundamental'nyye matritsy resheniy obshchikh parabolicheskikh sistem)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 120, Nr 5, pp 980-983 (USSR)

ABSTRACT: With the aid of the same methods with which the author (in earlier papers [Ref 3,4]) constructed and investigated the fundamental metrices of the solutions of linear systems being parabolic in the sense of Petrovskiy, fundamental solution matrices for general parabolic systems

$$(1) \quad \frac{\partial^{n_i} u_i}{\partial t^{n_i}} = \sum_{2bk_0 + |k| \leq 2bn_j} A_{ij}^{(k_0 k)}(x,t) \frac{\partial^{k_0}}{\partial t^{k_0}} D_x^k u_j(x,t)$$

are considered. It is shown that for certain assumptions on the continuity and boundedness of the coefficients of (1) the system (1) possesses a fundamental matrix of solutions which satisfies certain inequalities and which can be continued analytically into the complex domain under further assumptions. The integral operators, the kernels of which are the considered matrices in

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certain $L_p$-spaces, are explicitly characterized. For an in-
homogenous system obtained from the system (1) by addition of
further terms the author investigates the existence and uniqueness
of generalized solutions.
There are 4 references, 3 of which are Soviet and 1 American.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet, (Chernovtsy State University)

PRESENTED: December 9, 1957, by I.G.Petrovskiy, Academician

SUBMITTED: November 4, 1957

1. Mathematics

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16(1) SOV/140-59-2-27/30

AUTHOR: Eydel'man, S.D.

TITLE: Integral Maximum Principle for Strongly Parabolic Systems and Some of its Applications (Integral'nyy printsip maksimuma dlya sil'no parabolicheskikh sistem i nekotoryye yego prilozheniya)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1959, Nr 2, pp 252-258 (USSR)

ABSTRACT: The author establishes for strongly parabolic systems an integral maximum principle analogous to that of M.M. Lavrent'yev [Ref 1] for strongly elliptic systems.
Let $u(x,t)$ be a real regular solution of

$$\frac{\partial u}{\partial t} = \sum_{i,j=1}^{n} \frac{\partial}{\partial x_i}\left(A_{ij}(x,t)\frac{\partial u}{\partial x_j}\right) + \sum_{i=1}^{n} B_i(x,t)\frac{\partial u}{\partial x_i} + C(x,t)u$$

in the strip $\Pi_1$: $0 < t \leq T$, $-\infty < x_s < \infty$, and $g(x,t)$ be a differentiable function of $x_1, x_2, \ldots, x_n, t$ real in $\Pi_1$.

Theorem: If $u(x,t) \in W^{(1)}_{2,g}$, i.e. if for all $t_1 \in (0,T)$:

Integral Maximum Principle for Strongly Parabolic Systems and Some of its Applications SOV/140-59-2-27/30

$$\|u(x,t)\|_{W^{(1)}_{2,g}} \equiv \int_{t_1}^{T} dt \iint \left\{ |u|^2 + \sum_{i=1}^{n} \left|\frac{\partial u}{\partial x_i}\right|^2 \right\} dx < +\infty ,$$

$|A_{ij}(x,t)| \leq M$ for $(x,t) \in \Gamma_1$ and if the quadratic form

$$(\mathcal{E}c,c) \equiv -\sum_{i,j=1}^{n} (A_{ij}(x,t)a_i,a_j) + \sum_{i=1}^{n}((B_i + \sum_{j=1}^{n} A_{ij}\frac{\partial g}{\partial x_j})a_i,b) +$$

$$+((C - \frac{1}{2}\frac{\partial g}{\partial t}E)b,b) \leq 0$$

for all real vectors $c = (a_1,\ldots,a_n,b)$, then for $t_1 < t_2$ we have $F(t_1) \geq F(t_2)$, where

$$F(t) = \|u(x,t)\|_{L_{2,g}} = \int |u|^2 \exp\{-g(x,t)\} dx, \quad |u|^2 = \sum_{s=1}^{N} u_s^2 .$$

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Integral Maximum Principle for Strongly Parabolic Systems and Some of its Applications SOV/140-59-2-27/30

If furthermore $(\mathcal{L}c, c) \geq \psi(t)(b, b)$, $\psi(t) > 0$, then

$$F(t_1) \geqslant \exp\left\{-2\int_{t_1}^{t_2} \psi(\beta)\,d\beta\right\} \cdot F(t_2) .$$

Several conclusions of the theorem are mentioned.

There are 4 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Cherno[illegible] State University)

SUBMITTED: April 1, 1958

Card 3/3

16(1)

AUTHOR: Eydel'man, S.D. SOV/20-125-4-14/74

TITLE: On the Behavior of the Solutions of a Parabolic System in the Neighborhood of an Isolated Singular Point (O povedenii resheniy parabolicheskoy sistemy v okrestnosti izolirovannoy osoboy tochki)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 4, pp 743-745 (USSR)

ABSTRACT: According to Ya.B.Lopatinskiy [Ref 2] a function $\varphi(x)$ defined in the finite domain V of the n-dimensional space $x_1, x_2, \dots, x_n$ belongs to the functional set $K_p^{x_0}$, $K_{p-0}^{x_0} = \sum_{q<p} K_q^{x_0}$ if it is continuous for $x \neq x_0$, $x_0 \in V$ and if the expressions

1) $|\varphi(x)| \cdot |x-x_0|^p$, $p>0$; 2) $|\varphi(x)| / |\ln|x-x_0||$, $p = 0$; 3) $|\varphi(x)|$, $p<0$ are bounded.

Principal result: In the cylinder G $\{t_1 \leqslant t \leqslant t_2, x \in V\}$ with the exception of the point $(x_0, t_0)$ let $u(x,t)$ be a regular solution of the system

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On the Behavior of the Solutions of a Parabolic System in the Neighborhood of an Isolated Singular Point SOV/20-125-4-14/74

$$(1)\quad \frac{\partial^m u}{\partial t^m} = \sum_{2bk_o+|k|\leqslant 2bm} A^{(k_o k)}(x,t)\frac{\partial^{k_o}}{\partial t^{k_o}} D_x^k u,\ k_o \leqslant m-1.$$

Let

$$\int_{t_1}^{t_2} |t-t_o|^l \left|\frac{\partial^{k_o}}{\partial t^{k_o}} D_x^k u\right| dt \in K_{M+|k|-2b(m+1-k_o)+n-o};$$

$2bk_o+|k|\leqslant 2bm-1$; $l = 0,\ldots,r$; $r = \frac{M}{2b}$, if $\frac{M}{2b}$ is integral, $r = [M/2b]+1$ if $\frac{M}{2b}$ is a fraction. Let the coefficients of (1) be defined in $G_1\{t_1\leqslant t\leqslant t_2; x\in V_1\}$, $T\in V_1$ and have continuous derivatives of the order $k_o'+|k'|$; $2bk_o'+|k'|\leqslant 2b(r-1)+k_o+|k|$ in $G_1$. If $r=1$, then let the derivatives of A with respect to x up to the order $k_o+|k|$ be Hölderian. Then it holds

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$$u(x,t)=\begin{cases}\displaystyle\sum_{\substack{2bk_o+|k|\leqslant M-1\\ k_o\leqslant m-1}} \frac{\partial^{k_o}}{\partial t_o^{k_o}} D^k_{x_o} Z(t,t_o,x,x_o)a_{k_o k}(t_o,x_o)+u^*(x,t), & t>t_o\\ u^*(x,t), & t<t_o\end{cases}$$

where $u^*$ is regular in G and $Z(t,t_o,x,x_o)$ is the fundamental matrix of the solutions of (1) constructed in [Ref 4].
The author mentions I.G.Petrovskiy, S.V.Kovalevskaya, and E.E. Levi.
There are 6 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

PRESENTED: December 17, 1958, by I.N.Vekua, Academician

SUBMITTED: December 14, 1958

Card 3/3

16(1)

AUTHORS: Eydel'man, S.D., Porper, F.O. SOV/20-126-5-9/69

TITLE: On Some Properties of Parabolic Systems in the Sense of G.Ye. Shilov

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 948-950 (USSR)

ABSTRACT: Let the system

$$(1) \qquad \frac{\partial u}{\partial t} = \sum_{0<h\leqslant|k|\leqslant p} A_k(t)\, D_x^k u$$

be given, where $|k| = k_1 + k_2 + \dots + k_n$, $D_x^k =$

$$= \frac{\partial^{|k|}}{\partial x_1^{k_1}\partial x_2^{k_2}\dots\partial x_n^{k_n}}, \quad x = (x_1,\dots,x_n), \quad u = (u_1,\dots,u_n),$$

$A_k(t)$ is continuous and bounded for $t \geqslant 0$. At first the authors consider estimations of the Green matrix of the system. Then these estimations are used in order to investigate the solutions. Two theorems are given. Theorem. 1.) Every solution

On Some Properties of Parabolic Systems in the Sense of G.Ye. Shilov SOV/20-126-5-9/69

of (1) regular for $t \leq 0$ satisfying the condition

$|u(x,t)| \leq C\,[1 + |x|]^{\beta}$ is a system of polynomials of at most $[\beta]$-th degree in $x$.

2.) If the $A_k(t)$ are constants and if a solution regular in $t \leq 0$ satisfies the condition

$$|u(x,t)| \leq C\,[1 + |x|]^{\beta}\,[1 + |t|]^{\alpha},$$

then this solution is a system of polynomials of at most $[\beta]$-th degree in x and of at most the degree

$\min\left\{[\alpha], \left[\frac{\beta}{h}\right]\right\}$ in $t$.

I.G. Petrovskiy is mentioned in the paper. The authors thank G.Ye. Shilov and his followers for valuable discussions.

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On Some Properties of Parabolic Systems in the Sense of G.Ye. Shilov SOV/20-126-5-9/69

There are 2 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

PRESENTED: March 10, 1959, by I.N. Vekua, Academician

SUBMITTED: March 9, 1959

Card 3/3

16(1)

AUTHOR: Eydel'man, S.D. SOV/20-127-4-8/60

TITLE: Cauchy Problem for Parabolic Systems With Growing Coefficients

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 4, pp 760-763 (USSR)

ABSTRACT: The author investigates the correctness of the Cauchy problem for parabolic systems with growing coefficients. The fundamental matrix of the solutions is the up as the sum of the Green's matrix of a shortened system containing only the highest derivatives, and an additional term which is chosen so that the initial system is satisfied. For the Green's matrix there hold the earlier estimations of the author, wherefrom there follows the existence of the sought fundamental matrix and an estimation for it. It is stated that the conditions for the correctness of the Cauchy problem given in [Ref 1,2] are valid also for the considered systems if the growing coefficients do not exceed a certain potential order of increase. The author mentions I.G. Petrovskiy.
There are 2 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

PRESENTED: April 8, 1959, by I.G.Petrovskiy, Academician
SUBMITTED: April 3, 1959

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L 23861-65 EWT(d)/EWA(m)-2 IJP(c)

ACCESSION NR: AR4046313 S/0044/64/000/008/B066/B066

SOURCE: Ref. zh. Matematika, Abs. 8B337

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AUTHOR: Eydel'man, S. D.; Yangarber, V. A.

16

TITLE: Some new Liouville theorems on stability for parabolic systems

CITED SOURCE: Nauchn. yezhegodnik za 1958 g. Chernovitsk. un-t. Chernovtsy*, 1960, 480-483

TOPIC TAGS: parabolic system, Petrov concept, polynomial, square matrix, Green matrix, Liouville theorem, asymptotic stability

TRANSLATION: The parabolic system of the Petrov concept is examined

$$\frac{\partial u}{\partial t} - \sum_{|k|<2b} P_k\left(t, -i\frac{\partial}{\partial x}\right)u = P\left(t, -i\frac{\partial}{\partial x}\right)u, \qquad (1)$$

where $P_k(t, \sigma)$ is a polynomial, with respect to $\sigma_1, \ldots, \sigma_n$ square matrix of the

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K degree with continuous and finite coefficients. It is proved that upon satisfying certain conditions on the commutant of system (1) for the Green matrix G (t, $t_0$, x) of the system (1), the following estimate is correct:

$$\| G(t, t_0, x) \| < C(t-t_0)^{-\frac{n}{2b}} \times$$
$$\times \exp\left\{-(\sigma-E_0)(t-t_0) - C\left|\frac{x}{(t-t_0)^{\frac{1}{2b}}}\right|^{\frac{2b}{2b-1}}\right\}.$$

From this the author derives an amplified Liouville theorem and a theorem on asymptotic stability of the solution of system (1) with the help of criteria of asymptotic stability of solutions of the system of usual differential equations developed by Germaidze. O. Red'kina

SUB CODE: MA ENCL: 00

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SOV/42-15-1-18/27

AUTHOR: Eydel'man, S. D.

TITLE: On the Validity of Liouville Theorems for Solutions of Parabolic Systems

PERIODICAL: Uspekhi matematicheskikh nauk, 1960, Vol 15, Nr 1, pp 233-234 (USSR)

ABSTRACT: It is known that the classical Liouville theorem can be extended from harmonic functions to solution of general parabolic and elliptic systems (S. D. Eydel'man, Liouville Theorems and Theorems of Stability for Solutions of Parabolic Systems, Mat. sb. 44 (36): 4 (1958) 481-508) using examples introduced by R. E. Vinograd (On an Assertion of K. P. Persidskiy, U. M. N. Nr 2 (60) (1954) 125-128) in connection with stability problems of ordinary differential equation, the author constructs parabolic systems in the sense of I.G. Petrovskiy, with variable coefficients such that Liouville's theorem is not valid for the solutions. The examples given are:

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$$\left.\begin{aligned}\frac{\partial u_1}{\partial t} &= (\cos 2t - a)(-1)^b \frac{\partial^{2b} u_1}{\partial x^{2b}} + (-1 + \sin 2t)(-1)^b \frac{\partial^{2b} u_2}{\partial x^{2b}},\\ \frac{\partial u_2}{\partial t} &= (1 + \sin 2t)(-1)^b \frac{\partial^{2b} u_1}{\partial x^{2b}} + (-\cos 2b - a)(-1)^b \frac{\partial^{2b} u_2}{\partial x^{2b}}\end{aligned}\right\} \quad (1)$$

$$(0 < a \leqslant 1)$$

with solution: $u_1(x,t) = e^{ix+(1-a)t}\cos t, \quad u_2(x,t) = e^{ix+(1-a)t}\sin t,$ (2)

limited to a half-plane $t \leqslant 0$.

For parabolic systems:

$$\left.\begin{aligned}\frac{\partial v_1}{\partial t} &= (-1)^{b-1}\frac{\partial^{2b} v_1}{\partial x^{2b}} + (\cos 2t - a)v_1 + (-1 + \sin 2t)v_2,\\ \frac{\partial v_2}{\partial t} &= (-1)^{b-1}\frac{\partial^{2b} v_2}{\partial x^{2b}} + (1 + \sin 2t)v_1 + (-\cos 2t - a)v_2,\end{aligned}\right\} \quad ($$

$$0 < a \leqslant 1,$$

with solution:

$$v_1(x,t) = e^{(1-a)t}\cos t, \quad v_2(x,t) = e^{(1-a)t}\sin t, \quad (4)$$

limited to a half-plane $t \leqslant 0$.

There are 2 Soviet references.

SUBMITTED: August 11, 1958

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77815
SOV/42-15-1-22/27

AUTHOR: Eydel'man, S. D.

TITLE: Investigations in the Theory of Parabolic Systems (Doctor's Dissertation)

PERIODICAL: Uspekhi matematicheskikh nauk, 1960, 15, Nr 1, pp 251-256 (USSR)

ABSTRACT: The dissertation was defended at a session of the Soviet of the mechanico-mathematical faculty of Moscow University on April 3, 1959. The official opponents were Prof. S. G. Kreyn, Prof. G. E. Shilov, and doctor of the physico-mathematical sciences, E. M. Landis. The thesis is devoted to the investigation of fundamental solution matrices of arbitrary linear parabolic system, in the sense of I. G. Petrovskiy:

$$\frac{\partial^{n_i} u_i}{\partial t^{n_i}} = \sum_{2bk_0+|k|\le 2bn_j} A_{ij}^{(k_0 k)}(x, t)\frac{\partial^{k_0}}{\partial t^{k_0}} D^k u_j \qquad (i = 1, 2, \ldots, N) \qquad (1)$$

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where $D^k = \dfrac{\partial^{|k|}}{\partial x_1^{k_1} \ldots \partial x_n^{k_n}}$, $s^k = s_1^{k_1} \ldots s_n^{k_n}$, $s = \sigma + i\tau$, $z = x + iy$, $q = \dfrac{2b}{2b-1}$

Estimates of solutions are given and also their application to the investigation of Cauchy's problem for linear and nonlinear parabolic systems, their analyticity, smoothness, stability, and their extension to a neighborhood of singular points. Chapter 1 deals with the construction of the fundamental solution matrices. It is assumed that the ccefficients of (1) depend only on t. Corresponding to (1) the system of ordinary differential equations is studied:

$$\frac{d^{n_i} v_i}{dt^{n_i}} = \sum_{2bk_0 + |k| \leq 2bn_j}' A_{ij}^{(k_0 k)}(t)(i\sigma)^k \frac{d^{k_0} v_j}{dt^{k_0}} \quad (i = 1, 2, \ldots, N). \qquad (2)$$

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Let

$$V(t, \tau, s) - \| v_j^{(l)}(t, \tau, s) \|_{l, j=1}^{N}$$

be the matrix whose columns are solutions of (2) with initial conditions:

$$\left.\frac{d^{k_0} v_j^{(l)}}{dt^{k_0}}\right|_{t=\tau} = \delta_{jl}\delta_{k_0 n_l - 1} \qquad (k_0 = 0, 1, \ldots, n_j - 1, \quad j = 1, 2, \ldots, N)$$

where $\delta_{ij}$ is the Kroenecker delta. The Fourier transform of $V(t, \tau, s)$ is the Green's matrix $G(t, \tau, x)$ of (2):

$$G_j^{(l)}(t, \tau, x) = (2\pi)^{-n} \int e^{i(x, \sigma)} V_j^{(l)}(t, \tau, \sigma)\, d\sigma.$$

For the Green's matrix of system (1) the following estimate is given:

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$$\left.\begin{array}{l}\left|\dfrac{\partial^{k_0}}{\partial t^{k_0}} D_x^k G_j^{(l)}(t,\tau,z)\right| \leq C_{k_0 k}(t-\tau)^{n_j-k_0-1-\frac{|k|+n}{2b}} \exp\Big\{\Big(-c\sum_{s=1}^{n}|x_s|^q + \\ \quad + d\sum_{s=1}^{n}|y_s|^q\Big)(t-\tau)\Big\}^{-\frac{1}{2b-1}}, \qquad k_0 = 0, 1, \ldots, n_j;\ |k| = 0, 1, \ldots; \\ z_s = x_s + iy_s;\ \{-\infty < x_s < \infty,\ s = 1, 2, \ldots, n;\ 0 < t \leq T\}\, \Pi_T,\end{array}\right\} \quad (3)$$

where $C_{k_0 k}$, d are positive constants depending only on T, $c > 0$. These estimates permit the construction of fundamental matrices by E. E. Levi's method (S. D. Eydel'man, On Cauch's problem for parabolic systems, DAN 98 Nr 6, 913-915 (1954); S. D. Eydel'man, On Fundamental solutions of parabolic systems, Mat. sb. 38 (80): 1 (1956) 51-92; S. D. Eydel'man, Liouville theorems and stability theorems for solutions of parabolic systems, Mat. sb. 44 (86) : 2 (1958) 481-508). These matrices have properties important in applications; i.e., if $n_1 = n_2 = \ldots = n_N$ then the

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system adjoint to (1) is also parabolic. Chapter 2 investigates Cauchy's problem for linear and non-linear parabolic systems:

$$\left.\begin{aligned} \frac{\partial^{n_i} u_i}{\partial t^{n_i}} = \sum_{j=1}^{N} \sum_{2bk_0+|k|\leq 2bn_j} A_{ij}^{(k_0,k)}(x,t)\frac{\partial^{k_0}}{\partial t^{k_0}} D^k u_j + F_i\left(t, u, \ldots, \frac{\partial^{k_0'}}{\partial t^{k_0'}} D^{k'} u_j, \ldots\right), \\ 2bk_0' + |k'| \leq m_j \leq 2bn_j - 1, \end{aligned}\right\} \quad (6)$$

where $F_i$ is in general nonlinear. For the system

$$\left.\begin{aligned} \frac{\partial^{n_i} u_i}{\partial t^{n_i}} = F_i\left(t, x, u, \ldots, \frac{\partial^{k_0}}{\partial t^{k_0}} D^k u_j, \ldots\right) \\ (i = 1, 2, \ldots, N), \quad 2bk_0 + |k| \leq 2bn_j \end{aligned}\right\} \quad (8)$$

The Cauchy problem is studied in the class of sufficiently smooth, bounded functions. S. D. Eydel'man On Cauchy's problem for linear and nonlinear parabolic systems, DAN 115, Nr 2, 930-932 (1957). Chapter 3 is devoted to the study of properties of regular solutions of

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linear parabolic systems. In appendix 1 of the thesis, S. D. Eydel'man, Integral maximum principle for strongly parabolic systems and some of its applications, Iso. vyssh. ucheb. zaved, Mat., Nr 2 (1959) 252-258, a maximum principle is given for strongly parabolic systems permitting an easy proof of the uniqueness and stability for mixed problems in infinite domains, and the Cauchy problem in the class of rapidly growing functions. The results of the dissertation are given in the following 15 references: S. D. Eydel'man: On Cauchy problem for parabolic systems, DAN 98 Nr 6, (1954), 913-915; Liousville-type theorems for parabolic and elliptic systems, DAN 99 Nr Nr 5 (1954), 681-684; On the analyticity of solutions of parabolic systems, DAN 103 Nr 1 (1955), 27-30; Some theorems on stability of solutions of parabolic systems, DAN 115 Nr 2 (1957), 253-255; On Cauchy's problem for nonlinear and quasilinear parabolic systems, DAN 116 Nr 6 (1957), 930-932; On the behavior of the solution of the heat equation in the neighborhood of a singular point, Usp. Mat. Nauk XI Nr 3 (1956),

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