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S/020/61/139/001/007/018
B104/B231

244200

AUTHOR: Naymark, B. M.

TITLE: Some nonlinear boundary value problems in the theory of the Maxwellian body

PERIODICAL: Akademiya nauk SSR, Doklady, v. 139, no. 1, 1961, 63 - 66

TEXT: Some physical problems dealing with the motion of an elastic body exhibiting relaxing stresses involve finding the displacement vector $\vec{u}(x_1, x_2, x_3, t)$ with the components u_1, u_2, and u_3, and the stress tensors $\sigma_{x_i x_j}(x_1, x_2, x_3, t)$, i, j, = 1, 2, 3. These satisfy equations

$$\vec{\sigma} = N_1\vec{\varepsilon} - N_2\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{2\mu}{3T}\vec{\varepsilon}\,d\tau, \qquad (1)$$

$$\mu\Delta u + (\lambda+\mu)\,\mathrm{grad}\,\mathrm{div}\,u + \rho F = \vec{\Phi}_t(u),$$

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Here, the $\vec{\varepsilon}$ form the columns with the components $\partial u_1/\partial x_1$, ..., $\partial u_3/\partial x_3$, $\partial u_1/\partial x_2 + \partial u_2/\partial x_1$, $\partial u_1/\partial x_3 + \partial u_3/\partial x_1$, $\partial u_2/\partial x_3 + \partial u_3/\partial x_2$; $\vec{\sigma}$ is the column with the components $\sigma_{x_1x_1}$, $\sigma_{x_2x_2}$, $\sigma_{x_3x_3}$, $\sigma_{x_1x_3}$, $\sigma_{x_1x_2}$, $\sigma_{x_2x_3}$; λ and μ stand for the Lamé constants. $\rho(x_1, x_2, x_3)$ is the positive density function; $\vec{F}(x_1, x_2, x_3, t)$ is the vector of the volume forces; $T(x_1, x_2, x_3, t, \vec{\sigma})$ is the relaxation time. Furthermore, the following formulas apply to N_1, N_2, and the vector $\Phi_t(\vec{u})$:

$$N_1 = \begin{pmatrix} \lambda+2\mu & \lambda & \lambda & 0 & 0 & 0 \\ \lambda & \lambda+2\mu & \lambda & 0 & 0 & 0 \\ \lambda & \lambda & \lambda+2\mu & 0 & 0 & 0 \\ 0 & 0 & 0 & \mu & 0 & 0 \\ 0 & 0 & 0 & 0 & \mu & 0 \\ 0 & 0 & 0 & 0 & 0 & \mu \end{pmatrix}, \quad N_2 = \begin{pmatrix} 2 & -1 & -1 & 0 & 0 & 0 \\ -1 & 2 & -1 & 0 & 0 & 0 \\ -1 & -1 & 2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 3/2 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3/2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 3/2 \end{pmatrix}. \quad (2)$$

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$$\Phi_{ij}(u) = \frac{\partial}{\partial x_i}\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{2\mu}{3T}\left(2\frac{\partial u_j}{\partial x_i} - \frac{\partial u_j}{\partial x_j} - \frac{\partial u_k}{\partial x_k}\right)d\tau + \tag{3}$$

$$+\frac{\partial}{\partial x_j}\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{\mu}{T}\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right)d\tau + \frac{\partial}{\partial x_k}\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{\mu}{T}\left(\frac{\partial u_j}{\partial x_k} + \frac{\partial u_k}{\partial x_j}\right)d\tau,$$

The author assumes, moreover, that the point x_1, x_2, x_3 is positioned in a bounded region D of the threedimensional space and that the boundary Γ of this region is a plane whose curvature is continuous. Moreover, it is assumed that $\Gamma = \Gamma_1 + \Gamma_2$, and that the boundary separating Γ_1 from Γ_2 constitutes a smooth curve. The following three boundary value problems are investigated: 1) Finding the vector $\vec{u}(x_1, x_2, x_3, t)$ and the stress tensor $\sigma_{x_i x_j}(x_1, x_2, x_3, t)$, which satisfy equation (1) and boundary

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conditions $\vec{u}(s) = \vec{\varphi}(s, t)$, $s \in \Gamma$, $\vec{\varphi}(s, t)$ is a given vector. 2) Finding a vector $\vec{u}$ and a stress tensor $\sigma_{x_i x_j}$, which satisfy equation (1) and boundary condition $\sigma_{x_i x_1} \cos nx_1 + \sigma_{x_i x_2} \cos nx_2 + \sigma_{x_i x_3} \cos nx_3 = X_i(s, t)$, $S \in \Gamma$, $i = 1, 2, 3$. Here $\cos nx_i$ are the direction cosines of the outer perpendicular to Γ; X_i is a given vector (vector of outer forces). 3) Finding a vector $\vec{u}$ and a stress tensor $\sigma_{x_i x_j}$, which satisfy (1) and boundary conditions of 1) with respect to Γ_1, and those of 2) with respect to Γ_2. For the purpose of solving these boundary value problems a Hilbert space $\mathfrak{N}$ is introduced as well as a linear normalized space $\mathfrak{N}(t_1, t_2)$ of the vector functions with values in $\mathfrak{N}$. In these spaces

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$$W(u, v) = \iiint_D \Big[\lambda\Big(\frac{\partial u_1}{\partial x_1} + \frac{\partial u_2}{\partial x_2} + \frac{\partial u_3}{\partial x_3}\Big)\Big(\frac{\partial \sigma_1}{\partial x_1} + \frac{\partial \sigma_2}{\partial x_2} + \frac{\partial \sigma_3}{\partial x_3}\Big) +$$

$$+ 2\mu \frac{\partial u_1}{\partial x_1}\frac{\partial \sigma_1}{\partial x_1} + 2\mu \frac{\partial u_2}{\partial x_2}\frac{\partial \sigma_2}{\partial x_2} + 2\mu \frac{\partial u_3}{\partial x_3}\frac{\partial \sigma_3}{\partial x_3} + \mu\Big(\frac{\partial u_1}{\partial x_2} + \frac{\partial u_2}{\partial x_1}\Big)\Big(\frac{\partial \sigma_1}{\partial x_2} + \frac{\partial \sigma_2}{\partial x_1}\Big) +$$

$$+ \mu\Big(\frac{\partial u_1}{\partial x_3} + \frac{\partial u_3}{\partial x_1}\Big)\Big(\frac{\partial \sigma_1}{\partial x_3} + \frac{\partial \sigma_3}{\partial x_1}\Big) + \mu\Big(\frac{\partial u_2}{\partial x_3} + \frac{\partial u_3}{\partial x_2}\Big)\Big(\frac{\partial \sigma_2}{\partial x_3} + \frac{\partial \sigma_3}{\partial x_2}\Big)\Big] dx_1 dx_2 dx_3. \quad (4)$$

is valid, and a pair $\vec{\psi} = \{\vec{u}_1, \vec{\sigma}\}$ is designated as solution of equations (1) with one of the boundary conditions from 1) to 3), so that the pair $\vec{\psi}_1 = \{\vec{u}_1, \vec{\sigma}\}$ will satisfy equation

$$(\vec{\psi}_1, \vec{\psi}) = \iiint_D [N_1 P_0 \vec{\psi}_1, P_{L_1} \vec{\psi}]\, dx_1 dx_2 dx_3 -$$

$$- \iiint_D \Big[N_2 \int_0^t \exp\Big[-\int_\tau^t \frac{ds}{T}\Big]\frac{2\mu}{5T} P_0 \vec{\psi}_1\, d\tau, P_{L_2} \vec{\psi}\Big] dx_1 dx_2 dx_3 +$$

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$$+\int\int\int_D\left[N_s\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{2\mu}{3T}P_0\vec{\psi}_1\,d\tau,\ P_0\vec{\psi}\right]dx_1\,dx_2\,dx_3 -$$

$$-\int\int\int_D\left[N_s\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{2\mu}{3T}\vec{e}_x\,d\tau,\ P_{L_1}\vec{\psi}\right]dx_1\,dx_2\,dx_3 +$$

$$+\int\int\int_D\left[N_s\int_0^t \exp\left[-\int_\tau^t \frac{ds}{T}\right]\frac{2\mu}{3T}\vec{e}_z\,d\tau,\ P_0\vec{\psi}\right]dx_1\,dx_2\,dx_3. \qquad (6)$$

for any pair $\vec{\psi}\in\mathcal{N}$. The solution $\psi_{1n}\in\mathcal{N}(0,\ t_0)$ found in this way is referred to as Euler's open polygon of problem (1) with the boundary conditions from 1) to 3). To conclude, the following lemma and the following theorems are established and proved: Lemma: Euler's open polygon system is equally limited and continuous to an equal degree in $\mathcal{N}$ on section $0 \leqslant t \leqslant t_0$ if conditions

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$$\sup_{0<t<t_0} W(u_1, u_2) < \infty, \qquad \inf_{\substack{x\in D \\ 0<t<t_0 \\ -\infty<|\vec{\sigma}|<\infty}} T(x_1, x_2, x_3, t, \vec{\sigma}) > 0. \tag{7}$$

are met. Theorem 1: if (7) is met and

$$\sup_{0<t<t_0} \left|\frac{\partial}{\partial t} W(u_1, u_2)\right| < \infty, \quad \sup_{\substack{x\in D \\ 0<t<t_0 \\ -\infty<|\vec{\sigma}|<\infty}} \left|\frac{\partial T}{\partial t}\right| < \infty, \quad \sup_{\substack{x\in D \\ 0<t<t_0 \\ -\infty<|\vec{\sigma}|<\infty}} \left|\frac{\partial T}{\partial \vec{x}}\right| < \infty, \tag{8}$$

applies, (6) has a unique solution which belongs to $\mathfrak{N}(0, t_0)$. Theorem 2: if (7) and (8) are met, system

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$$\sigma_k^{(n)}(t) = \Phi_t\left(\sum_{i=1}^{n} \sigma_i^{(n)}(t)\, g_i,\ g_k\right), \quad k = 1, 2, \ldots, n, \qquad (9)$$

has a unique solution. In addition this solution for any $\vec{\psi} \in \Omega$ is also uniform on the entire section $0 \leq t \leq t_0$ $(\vec{\psi}_1 - \vec{\psi}_1^{(n)}, \vec{\psi}) \longrightarrow 0$, $n \longrightarrow \infty$, where $\vec{\psi}_1$ represents the solution of (6). $\Phi_t(\vec{\psi}, \vec{\psi})$ in (9) denotes the right-hand part of (6). There are 2 Soviet-bloc references.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Physics of the Earth imeni O. Yu. Shmidt, Academy of Sciences USSR)

PRESENTED: February 16, 1961, by A. A. Dorodnitsyn, Academician

SUBMITTED: February 13, 1961

Card 8/8

NAYMARK, B.M.

Functional methods in the theory of the Maxwell body with variable relaxation. Report No.2. Trudy Inst. fiz. Zem. no.20:67-112 '62. (MIRA 15:8)

(Elasticity)

MAYMARK, B. M.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Institute of Earth Physics imeni O. Yu. Shmidt in 1962:

"Several Functional Methods in the Theory of Integral-Differential Equations of Nonideal Elasticity."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

DAVYDKOVA, N.A.; NAYMARK, D.A.

Two cases of congenital toxoplasmosis. Pediatriia 38 no.10: 69-70 O '60. (MIRA 13:11)

1. Iz gorodskoy prosektury Barnaula (zav. - kand.med.nauk S.F. Yushkov).

(TOXOPLASMOSIS)

NEYMARK, I.I. (Barnaul, prospekt Lenina, d.53, kv.10); NEYMARK, D.A. (Barnaul, ul. 1-go Maya, d.10, kv.7)

Diagnosis of the cavitary form of pulmonary cancer. Vop. onk. 10 no.5:11-14 '64. (MIRA 18:8)

1. Iz fakul'tetskoy khirurgicheskoy kliniki (zav. - prof. I.I. Neymark) Altayskogo meditsinskogo instituta (rektor - dotsent F.M.Kolomiytsev).

NAYMARK, E.L.

Investigating the means of spectrum analysis process of volatalizing impurities in raw materials and semi-finished products of the lead industry. Trudy Inst. met. i obogashch. AN Kazakh. SSR 2:47-57 '60.
(Lead ores) (Ore dressing) (MIRA 13:10)

NAYMARK, F., master sporta (g.Moskva)

The best way to the target. Kryl.rod. 12 no.6:22 Je '61. (MIRA 14:6)

(Parachuting)

NAYMARK, I. G.

PA162T23

USSR/Electricity - Boilers, Jul 50
High-Pressure
Power Stations

"Some Details Regarding the Installation of the PK-10 Boiler in Prefabricated Sections," I. G. Naymark, M. I. Kholmogorov, Engineers

"Elek Stantr" No 7, pp 23-29

Describes how new high-pressure PK-10 boiler manufactured at Podol'sk plant was installed in electric power station in 1949. Includes dimen- sions and constructional details of boiler and table giving its subdivision into prefabricated

162T23

USSR/Electricity - Boilers, Jul 50
High-Pressure (Contd)

sections. Concludes boiler is unsuitable for installation by sections. Gives summary of advantages and disadvantages of various types of crane and derricks for this type work.

162T23

NAYMARK, I.G., inzhener.

Moving a stationary side wall of a boiler room. Elek.sta. 27 no.2:50-51 F '56. (MLRA 9:6)
(Steam power plants) (Walls)

KOZAK, B.A., inzh.; MAYMARK, I.G., inzh.

Assembly of prefabricated reinforced concrete structures of the main housing of a thermal electric power plant using a herringbone hoist. Energ. stroi. no.16:3-12 '60. (MIRA 16:12)

1. Proyektnaya kontora "Sevenergoproyekt".

NAYMARK, Iosif Izrailevich; ALEKSANDROVSKIY, A., red.; NEMCHENKO, I., tekhn.red.

[Housing construction; handbook for people building their own houses] Individual'noe zhilishchnoe stroitel'stvo; posobie dlia zastroishchikov. Kiev, Gos.izd-vo lit-ry po stroit. i arkhit. USSR, 1959. 269 p.
(Building) (MIRA 13:4)

KAYMARK, I.I., dots.

Analysis of fatalities in perforative gastric and duodenal ulcers. Khirurgiia 35 no.2:56-61 F '59. (MIRA 12:5)

1. Iz fakul'tetskoy khirurgicheskoy kliniki I Leningradskogo meditsinskogo instituta imeni I.P.Pavlova (zav. kafedroy - deystvitel'nyy chlen AMN SSSR prof. A.V.Mel'nikov [deceased]).
(PEPTIC ULCER, perforation,
fatal, statist. analysis (Rus))

МАЙМАРК, Е.К.

FAYERSHTEYN, D.G., kandidat tekhnicheskikh nauk; MAYMARK, I.K., inshener; GORBATKO, P.A., inshener.

Operating control of a mechanical incomplete combustion of fuel. Energetik 2 no.3:1-4 Mr '54. (MLRA 7:5)

(Furnaces--Construction)

MAYMARK, I.E., inzhener; PET'KO, V.M., inzhener; RABINOVICH, O.M., professor; FAYERSHTEYN, D.G., kandidat tekhnicheskikh nauk.

Improving the efficiency of a boiler unit operating on anthracite coal dust. Elek.sta. 25 no.11:8-10 N '54. (MLRA 7:11)
(Steam boilers)

Naymark, I K

Subject : USSR/Electricity AID P - 2061

Card 1/2 Pub. 26 - 3/29

Authors : Naymark, I. K., Pet'ko, V. M., Radzivilov, A. I.,and Fayershteyn, D. G., Engs.

Title : Venting of returned pulverized anthracite culm from separators

Periodical: Elek. sta., 4, 11-14, Ap 1955

Abstract : The milling of anthracite culm requires about 30 per cent of all power supplied for the needs of the plant. The article describes tests made with venting light particles of pulverized culm returned from the separator and milled in ball mills. A detailed description of the venting installation tested is given, and all additional devices and improvements are enumerated. The design of the separators was improved after these tests and the production increased 20%, while the needed amount of electric power decreased 15.5%. Two tables and 4 diagrams are included.

AID P - 2061

Elek. sta., 4, 11-14, Ap 1955

Card 2/2 Pub. 26 - 3/29

Institution: Department of Turbine Building (Khar'kov Polytechnic Institute im. V. I. Lenin

Submitted : No date

Naymark, I.K.

Subject : USSR/Power AID P - 4066

Card 1/1 Pub. 26 - 24/33

Authors : Bronshteyn, I. P., Eng. and I. K. Naymark

Title : Use of compact slag pits equipped with hydraulic valves for boilers with heated funnels.

Periodical : Elek. sta., 12, 52-53, 1955

Abstract : The operation of slag shafts equipped with hydraulic valves is discussed in detail and their use is strongly recommended. Two diagrams.

Institution : None

Submitted : No date

MAYMARK, I.K., inzh.

Burners for natural gas. Elek. sta. 29 no.4:12-16 Ap '58.
(Burners) (MIRA 11:8)

NAYMARK, I.K., inzh.

Experience in the starting operation of the Zmiyevsk State Regional Power Plant. Elek. sta. 33 no.4:15-18 Ap '62. (MIRA 15:7)

(Electric power plants)

NAYMARK, D.A.

Chorioepithelioma of the mediastinum in men. Probl. endok. i gorm. 11 no.1:62-65 Ja-F '65. (MIRA 18:5)

1. Fakul'tetskaya khirurgicheskaya klinika (zav. - prof. I.I. Neymark) i kafedra patolcgicheskoy anatomii (zav. - prof. A.G. Varshavskiy) Altayskogo meditsinskogo instituta, Barnaul.

NAYMARK, I.S.

For higher-level industrial production. Leg. prom. 17 no.12:6-8 D '57. (MIRA 11:1)

1. Direktor Khar'kovskoy chulochnoy fabriki.
(Hosiery industry--Management)

1. NAYMARK, I. YA

2. USSR (600)

4. Packaging

7. Greater attention to packing and shipping. Tabak 12 no. 5, 1952

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

1. NAYMARK, I. Ya.

2. USSR (600)

4. Tobacco Industry

7. Effect of repeated shredding on the quality of makhorka and production loss. Tabak 13 no. 6, 1952.

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

NAYMARK, I. Ya.

Machinery - Maintenance and Repair

Regularize spare parts supply for makhorka factory equipment.
Tabak 14, No. 1, 1953

Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

KISELEV, A.V.; LYGIN, V.I.; NAYMARK, I.Ye.; SLIN'YAKOVA, I.B.; CHEN' VEN'-KHAN [Ch'en Wên-hang].

Electron microscopic and adsorption studies of silica sols and silica gels [with summary in English]. Koll. zhur. 20 no.1:52-58 Ja-F '58. (MIRA 11:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova, Laboratoriya adsorbtsii, Institut fizicheskoy khimii AN USSR.
(Silica) (Adsorption) (Electron microscopy)

USSR / Cultivated Plants. Grains. M-3

Abs Jour: Ref Zhur-Biol., 1958, No 16, 72918.

Author : Naymark, L. B.; Novitskiy, S. M.
Inst : Belorussian Agricultural Academy.
Title : Of an Experiment in Cultivation of Corn at the Training Experimental Farm of the Belorussian Agricultural Academy.

Orig Pub: Tr. Belorussk. s.-kh. akad., 1957, 23, No 2, 93-103.

Abstract: Periods and rates of planting, significance of different combinations of organic and mineral fertilizers, influence of shelterbelts were studied. Differentiated periods of planting create plantations of different ages which is of practical value for the farm. Short planting periods are recommended (3-5 days); 2-3 plants per hill which is assured by planting 7-10 grains in a hill (32-36

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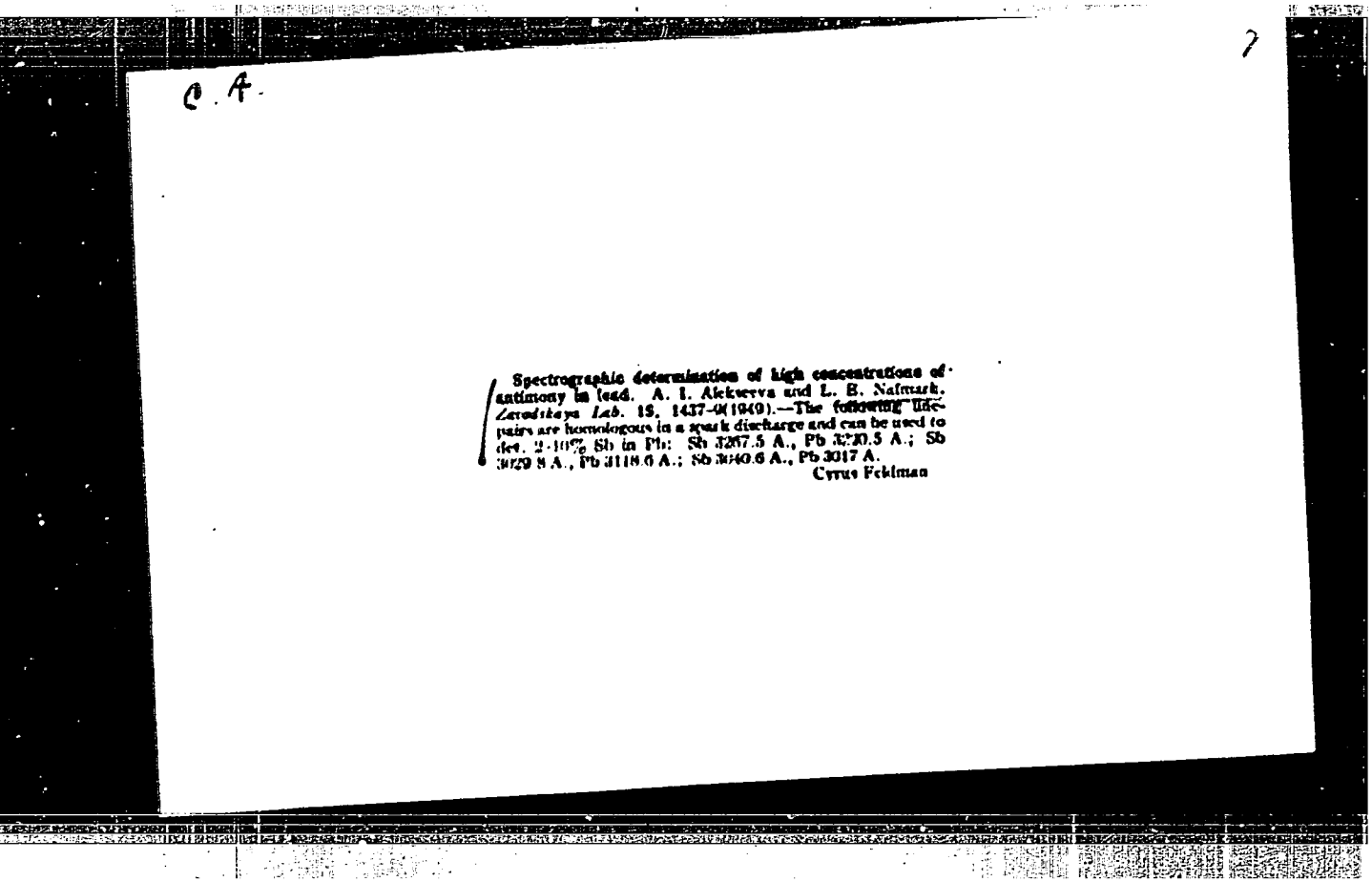

C. A.

7

Spectrographic determination of high concentrations of antimony in lead. A. I. Alekseeva and L. B. Naimark. *Zavodskaya Lab.* 15, 1437-40(1949).—The following line-pairs are homologous in a spark discharge and can be used to det. 2-10% Sb in Pb: Sb 3267.5 A., Pb 3220.5 A.; Sb 3029.8 A., Pb 3118.0 A.; Sb 3040.6 A., Pb 3017 A.
Cyrus Feldman

NAYMARK, L. E.

USSR/Metals - Zinc, Analysis Dec 50

"Spectrographic Determination of Cadmium, Lead, and Copper in Metallic Zinc," A. I. Alekseyeva, L. E. Naymark, Inst of Astr and Phys, Acad Sci Kazakh SSR

"Zavod Lab" No 12, pp 1511-1513

Developed method for detn of Pb and Cd in metallic Zn at concns from 0.002 to 2% and Cu from 0.0003 to 0.0015%. Conducted anal of highly pure Zn by method of 3 stds, using activated ac arc; used condensed spark for anal of lower-grade Zn. Av relative error of detn was 5% for Cd and 6% for Pb and Cu.

182T98

MAYMARK, L.G.

Jan 4
(3)

[illegible] Abstracts
[illegible] 22 No. 4
[illegible] 10, 1954
[illegible] Chemistry

Spectrographic determination of high concentrations of tin in lead. A. I. Alekseeva and L. G. Maimark. *Trudy Inst. Akad. Nauk Kazakh. S.S.R.* No. 10, *Ser. Khim.* 6 (1) No. 5, 91-7(1951).—High contns. of Sn in Pb were satisfactorily detd. spectrographically by the spark technique by making use of the following homologous line pairs: Sn 3262.4 and Pb 3455.0, Sn 3283.5 and Pb 3740.2, Sn 2913.5 and Pb 2873.0, and Sn 2613.5 and Pb 3118.2 A. Relative error was 2-4.2%, with abs. error of 0.04-0.22% in concn. range of 2-10% Sn. G. M. Kosolapoff

NAYMARK, L. E., ALEKSEYEV, A. I., YAVNEL, A. A., and KALININ, S. K.

Atlas Spektral'nykh Liniy (Atlas of Spectral Lines), Moscow, Gostekhizdat, 1952

NAYMARK, L.E.

KALININ, S.K.; YAVNEL', A.A.; NAYMARK, L.E.

[Tables of arc and spark spectra of iron from 2084 to 6546 A] Atlas dugovogo i iskrovogo spektrov zheleza ot 2084 do 6546 A. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1953. (MLRA 7:6)

(Iron) (Spectrum analysis--Tables, etc.)

BUYANOV, M.V., kandidat tekhnicheskikh nauk.

Review of the book "Atlas of arc and spark spectra of iron" by S.K.Kalinin, A.A.IAvnel', L.E.Maimark. Reviewed by M.V.Buianov. Zav.lab.21 no.9:1143 '55. (MLRA 9:1)

(Iron--Spectra) (Kalinin, S.K.) (lAvnel, A.A.) (L.E.Maymark)

KALININ, S.K.; NAYMARK, L.E.; NARZUVANOV, V.L.; ISMAGULOVA, K.I.; RUSANOV, A.K., professor, doktor tekhnicheskikh nauk, redaktor; POTAPOV, V.S. redaktor izdatel'stva; GUROVA, O.A., tekhnicheskiy redaktor

[Atlas of spectrum lines for a glass spectrograph; explanatory text and 26 diagrams] Atlas spektral'nykh linii dlia stekliannogo spektrografa; poiasnitel'nyi tekst i 26 planshetov. Pod red. A.K. Rusanova. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol. i okhrane nedr, 1956. 45 p., 26 l. (MLRA 10:4)
(Spectrum analysis--Tables, etc.)

NAYMARK, L.E.; YUDELEVICH, I.G.

Quantitative spectrographic determination of thallium, indium, germanium, gallium, tellurium, and cadmium in products of the lead industry. Izv. AN Kaz.SSR. Ser.met.obog. i ogneup. no.1:90-98 '58.
(MIRA 12:7)

(Nonferrous metals) (Spectrum analysis)

PHASE I BOOK EXPLOITATION 807/4045

Kalinin, S.K., A.A. Yavnel', A.I. Alekseyeva, V.L. Marzunvanov, and L.E. Naymark

Atlas spektral'nykh liniy dlya kvartsevogo spektrografa (Atlas of Spectral Lines for the Quartz Spectrograph). Moscow, Gosgeoltekhizdat, 1959. 43 p. 23 charts [in portfolio] Errata slip inserted. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk Kazakhskoy SSR. Fiziko-tekhnicheskiy institut.

Ed. of Publishing House: V.G. Filatov; Tech. Ed.: O.A. Gurova.

PURPOSE: This work is intended for use in spectral analysis laboratories, scientific institutions, industrial and geological laboratories, and other similar research establishments.

COVERAGE: This atlas of spectral lines, published under the auspices of the Commission on Spectroscopy of the Academy of Sciences, USSR, consists of a booklet and 23 photographic plates. The booklet contains quartz spectrograph spectral lines for 72 elements and tables on the excitation potentials of the lines and the ionization potentials of the elements which have great significance for the selection of analytic lines in quantitative spectral analysis.

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Atlas of Spectral Lines for the Quartz Spectrograph SOV/4045

The tables contain information on the overlapping of analytic lines by the lines of other elements. They can also be used in the spectral analysis of rocks, ores, minerals, soils, metals, and alloys. The atlas was composed by means of the ISP - 22 quartz spectrograph (the new model is the ISP - 28) and the PS - 18 spectroprojector. It is able to reproduce exactly the dimensions and forms of a spectrum obtained in most Soviet laboratories and can also be used with other average-dispersion devices whose parameters resemble closely the ISP - 22 spectrograph (Q - 24, E - 488, etc). The atlas makes it possible to break down the spectrum of various materials into the 72 elements in the whole range of the spectrum recorded by the spectrograph (2050 - 6800 Å). The authors thank S.L. Mandel'shtam, Professor A.K. Rusanov, and S.M. Rayskiy. There are 25 references: 14 Soviet, 6 English, 3 German, 1 French and 1 Italian.

TABLE OF CONTENTS:

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S/137/60/000/012/041/041
A006/A001

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, N . 12, p. 273, # 30266

AUTHORS: Naymark, L.E., Chalykh, P.N., Kokanov, A.

TITLE: Quantitative Spectrographical Determination of Beryllium and Scandium in Products of Processing Beryllium-Containing Ores

PERIODICAL: Izv. AN KazSSR, Ser. metallurgii, obogashcheniya i ogneuporov, 1959, No. 1 (4), pp. 85 - 89 (Kaz. summary)

TEXT: Samples and standards were mixed at a 1 : 1 ratio with a buffer mixture composed of carbon powder with 13% BaO and 2% Cr_2O_3 (Ba as a comparison element for Be, and Cr for Sc). After preliminary roasting in an electrode, acting as a cathode, the mixture was burnt in the anode of a d-c arc at 10 amp. The time of full burning out of the sample was 2 - 3 minutes. An ИСП-22 (ISP-22) spectrograph was used. The analytical pairs of lines and the ranges of concentrations to be determined are presented. The standards were prepared by the synthetical method on the base of a mixture of $CaSO_4$ and oxides of Si, Al, Mg and Fe.

Card 1/2

S/137/60/000/012/041/041
A006/A001

Quantitative Spectrographical Determination of Beryllium and Scandium in Products of Processing Beryllium-Containing Ores

Be and Sc were introduced into the standards in the form of oxides. Samples with a high Be and Sc content were, prior to the analysis, diluted with a mixture on the base of which the standards were prepared. The method was developed on specimens of very variegated composition and ensures the determination of 0.0003 - 0.3% Be and 0.001 - 1% Sc at a mean relative error of ± 8%. There are 7 references.

A. Sh.

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

Card 2/2

NAYMARK, L. E.

PHASE I BOOK EXPLOITATION SOV/4405

Kalinin, Sergey Ksenofontovich, Vasiliy Leonidovich Marzuvanov, Lyubov' Efroymovna Naymark, and Kul'tay Ismagulovna Ismagulova

Atlas spektral'nykh liniy dlya steklyannogo spektrografa (Atlas of Spectrum Lines for the Glass Spectrograph) [2d ed., rev.] Alma-Ata, Izd-vo AN KazSSR, 1960. 61 p. Errata slip inserted. 2,000 copies printed.

Sponsoring Agency: Akademiya nauk Kazakhskoy SSR.

Ed.: V. V. Aleksandriyskiy; Tech. Ed.: Z. P. Rorokina.

PURPOSE: This atlas is intended for spectroscopy experts working on the analysis of ores, metals, and alloys.

COVERAGE: The atlas contains photographs of an arc spectrum of iron in the range of 3718-9010 Å on which the location of more than 1,300 of the most intensive spectral lines of 81 elements, including inert gases and plutonium, are recorded. Wavelength tables of spectrum lines include

Card ~~1/10~~

excitation and ionization potentials. Detailed description of the atlas and instructions on its use in spectral analysis are also given. Soviet equipment, namely, a three-prism glass spectrograph ISP-51 with a UF-84 chamber and a PS-18 spectroprojector, was used in compiling the atlas which is intended for rapid interpretation of the visible and near infrared regions of the spectra of rocks, ores, soils, natural waters, metals, alloys, and biological materials. The Editor's Preface was written by A. K. Rusanov, Professor, Doctor of Technical Sciences. The Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Nuclear Physics Institute of the Academy of Sciences, Kazakh SSR) is the sponsoring agency. The authors thank A. R. Striganov, S. M. Rayskiy, N. S. Sventitskiy, and V. G. Koritskiy. There are 119 references: 112 Soviet, 6 English, and 1 German.

TABLE OF CONTENTS:

DEM'YANIKOV, I.G.; NAYMARK, L.E.

Present state and prospects for the expansion of optical and X-ray spectrum analysis methods. Trudy Inst. met. i obogashch. AN Kazakh. SSR 3:67-75 '60. (MIRA 14:6)
(Spectrum analysis)
(X-ray spectroscopy)

NAYMARK, L.E.; AKISHEVA, R.Z.; CHALYKH, P.N.

Effect of current strength and speed of vaporization of a specimen on the intensity of lines of an alternating current carbon arc spectrum. Izv.AN Kazakh.SSR.Ser.met., obog.i ogneup. no.2:97-103 '61. (MIRA 14:8)

(Spectrum analysis)

NAYMARK, L. G.

USSR/Human and Animal Morphology - Blood Circulation. R-5

Abs Jour : Referat Zhur - Biologii, No 16, 1957, 70670

Author : Tsutsulkovskaya, K.N., Naymark, L.G.
Inst :
Title : Characteristics of the Heart Function in Patients with Postpartum and Post-Abortive Fevers.

Orig Pub : Postpartum illnesses. L. Medgis. 1955, 30-38

Abstract : No abstract.

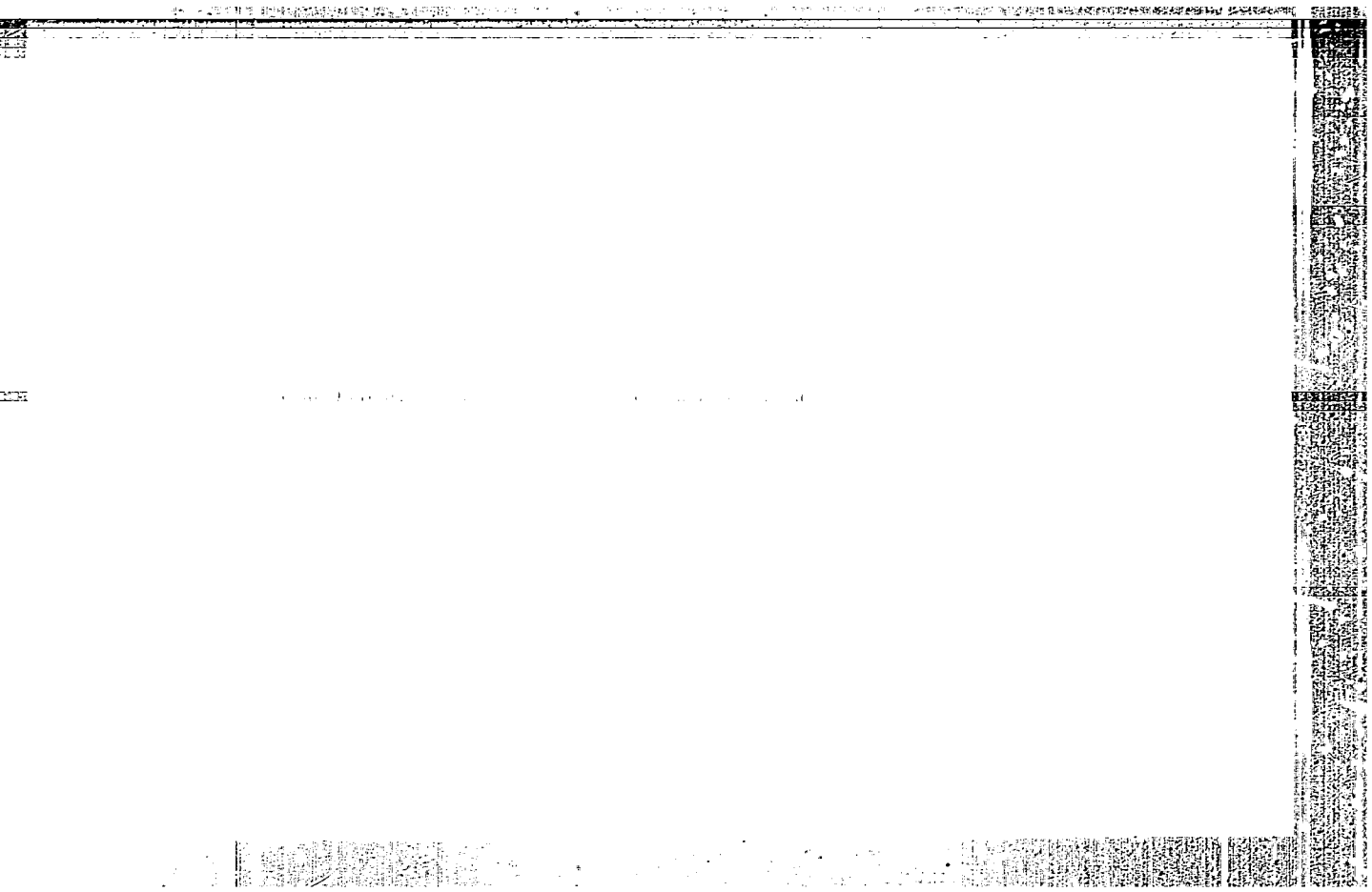
Card 1/1 - 127 -

NAYMARK, M.A.

Spektral'nyye funktsii simmetricheskogo operatora. IAN, SER. matem., 4(1940), 277-318.
O spektral'nykh funktsiyakh simmetricheskogo operatora. IAN. SER. matem., 7 (1943), 285-296.
Ob ekstremal'nykh svoystvakh spektral'nykh funktsiy simmetricheskogo operatora. DAN, 54 (1946), 7-10.
Ekstremal'nyye spektral'nyye funktsii simmetricheskogo operatora. IAN. ser. matem., 11 (1947), 327-344.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A.G.,
Markushevich, A.I.,
Rashevskiy, P.K.
Moscow-Leningrad, 1948

Math. Inst. im. Steklov, AS USSR



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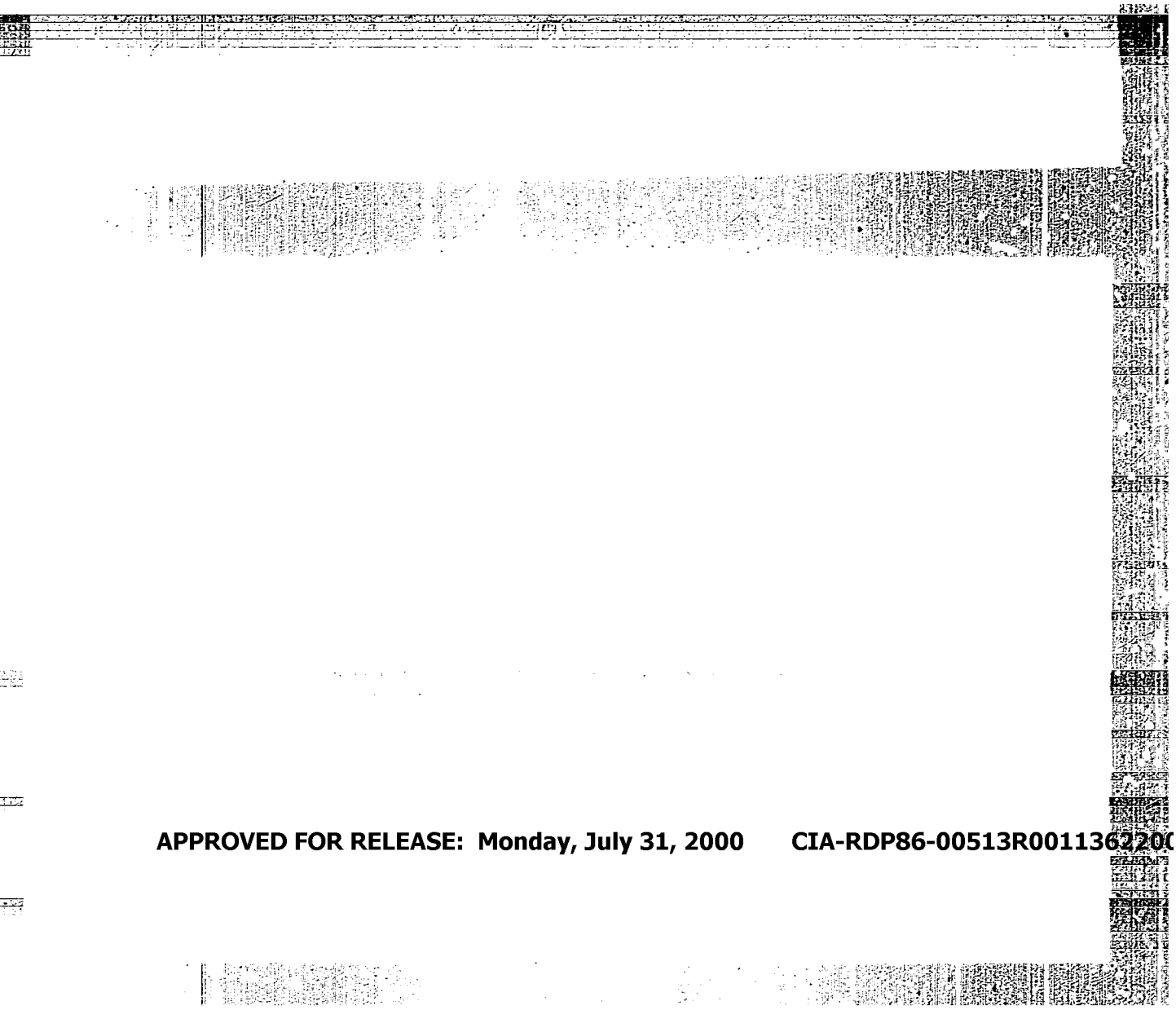

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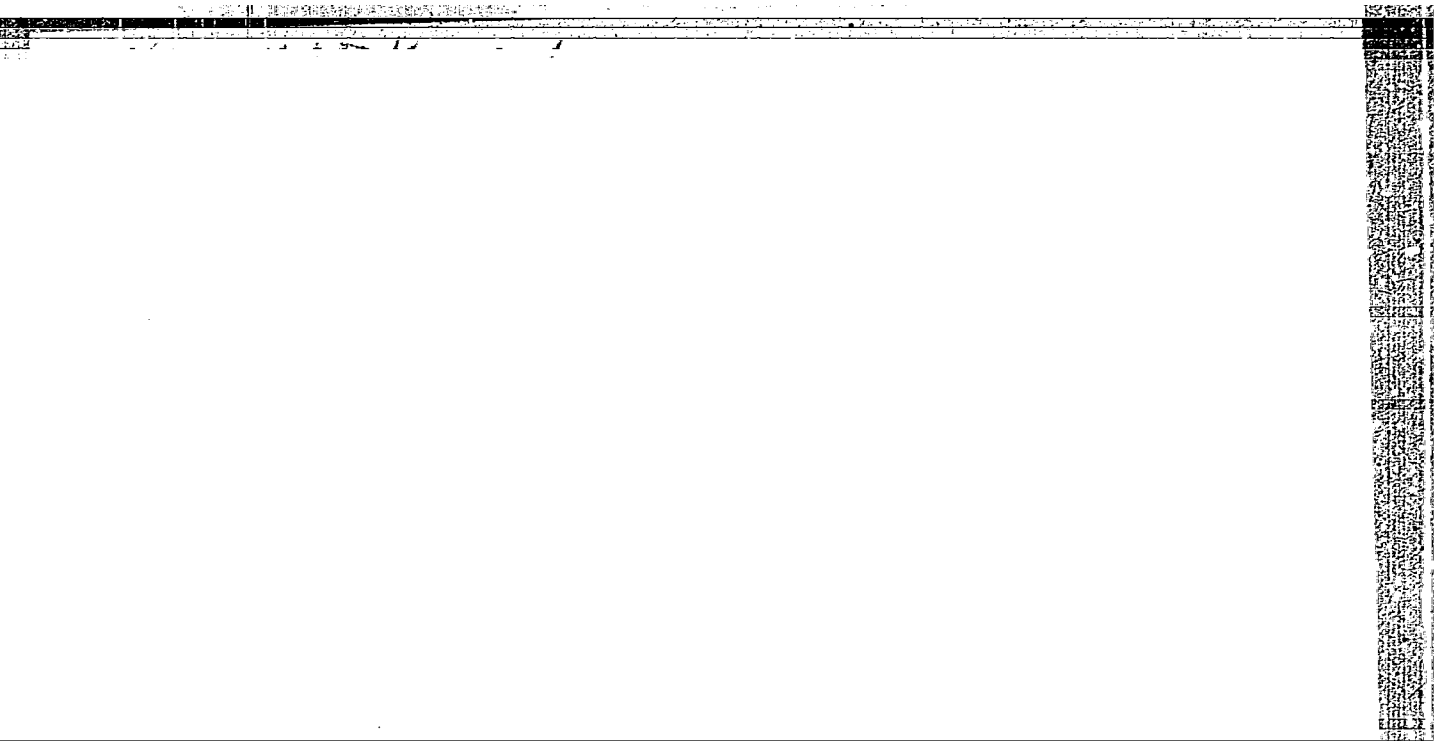

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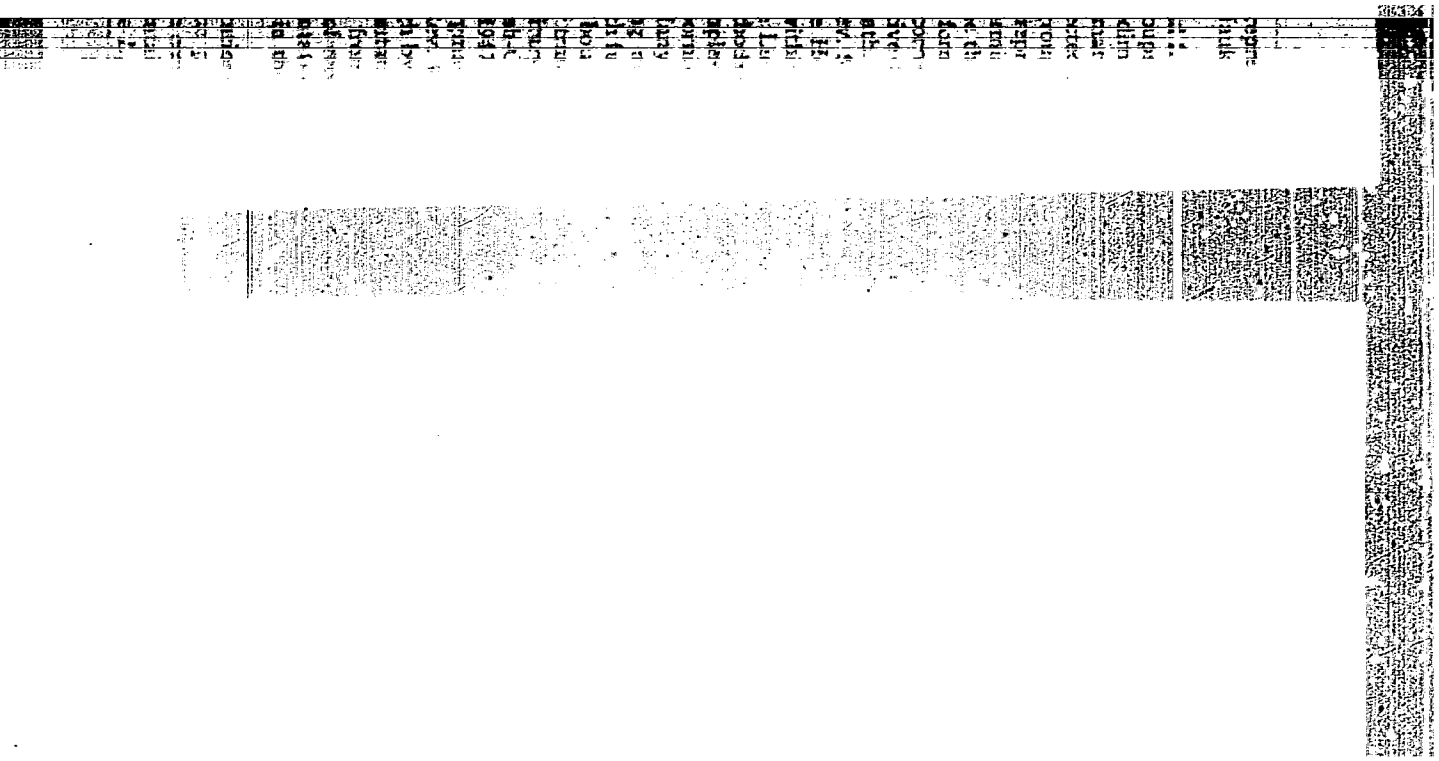

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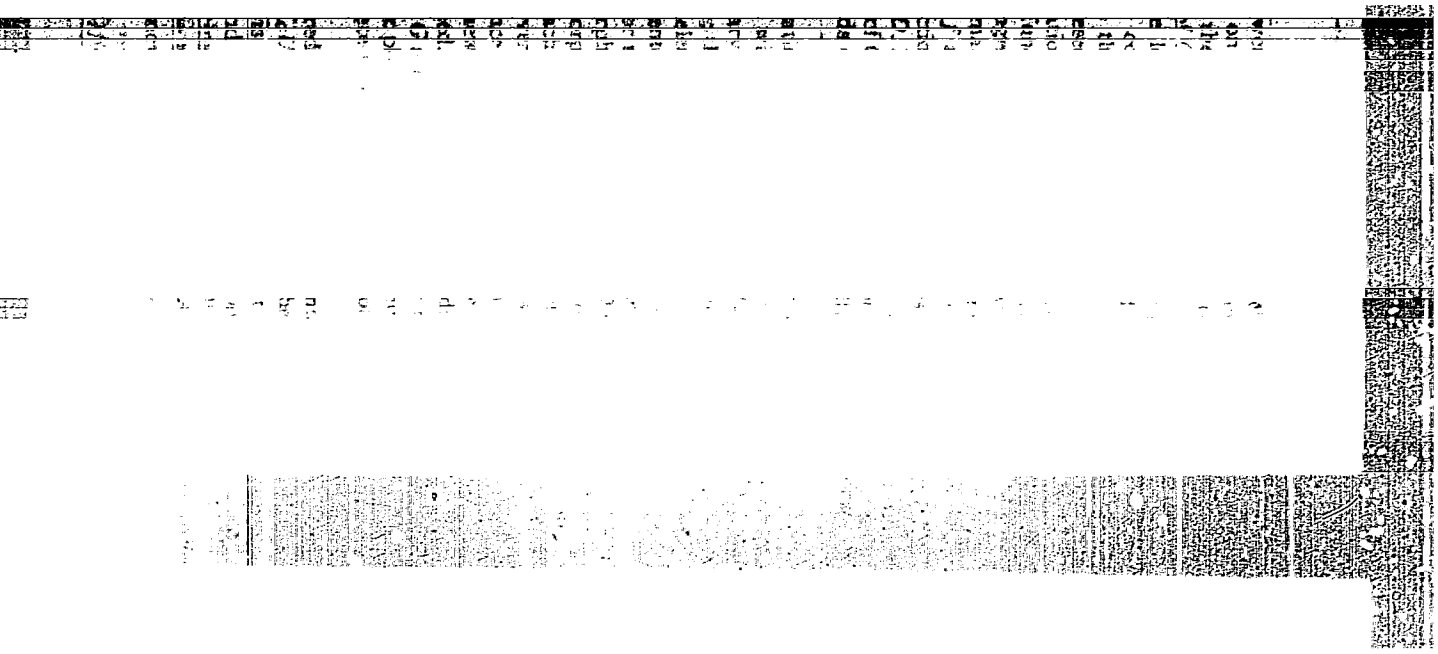

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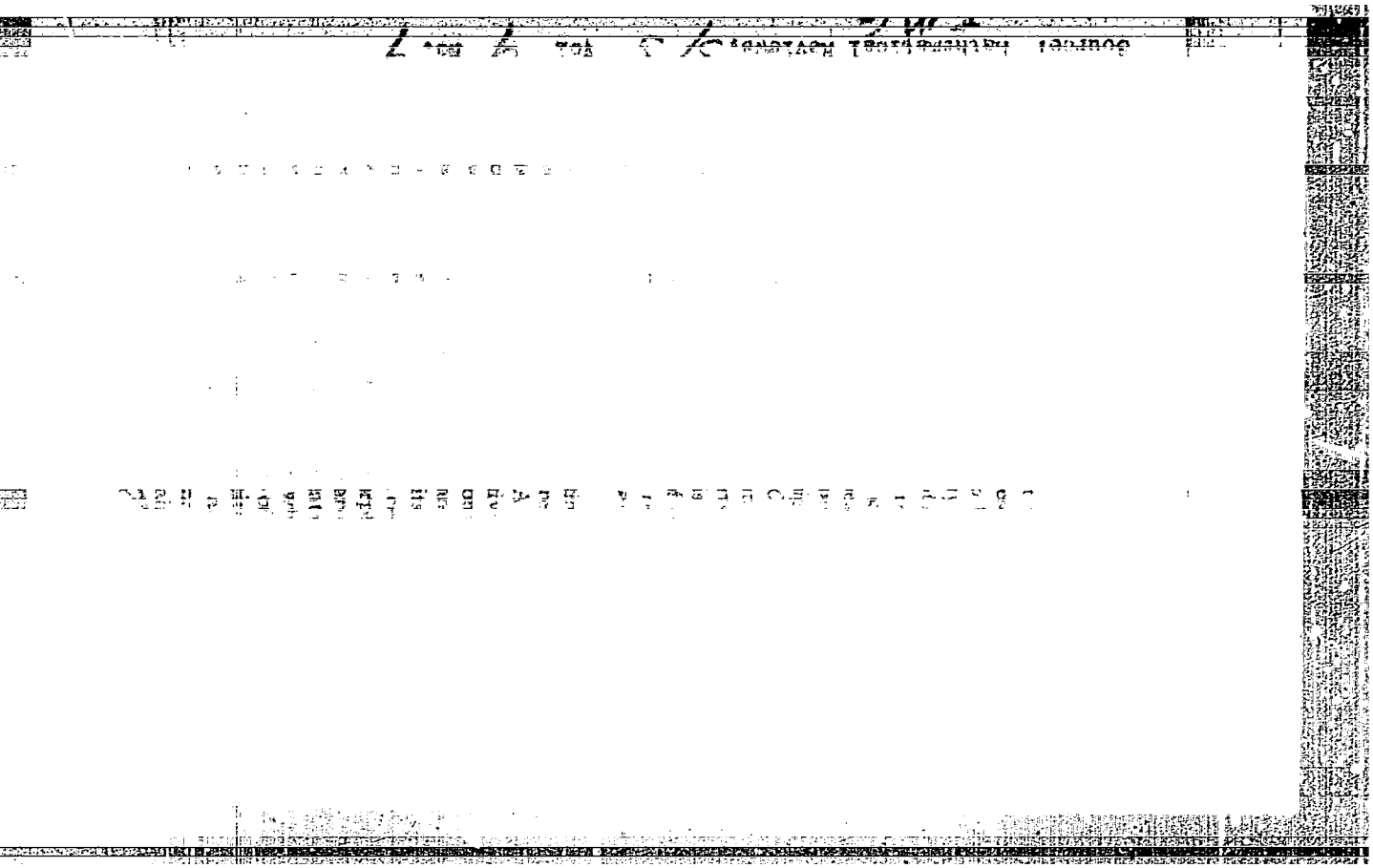

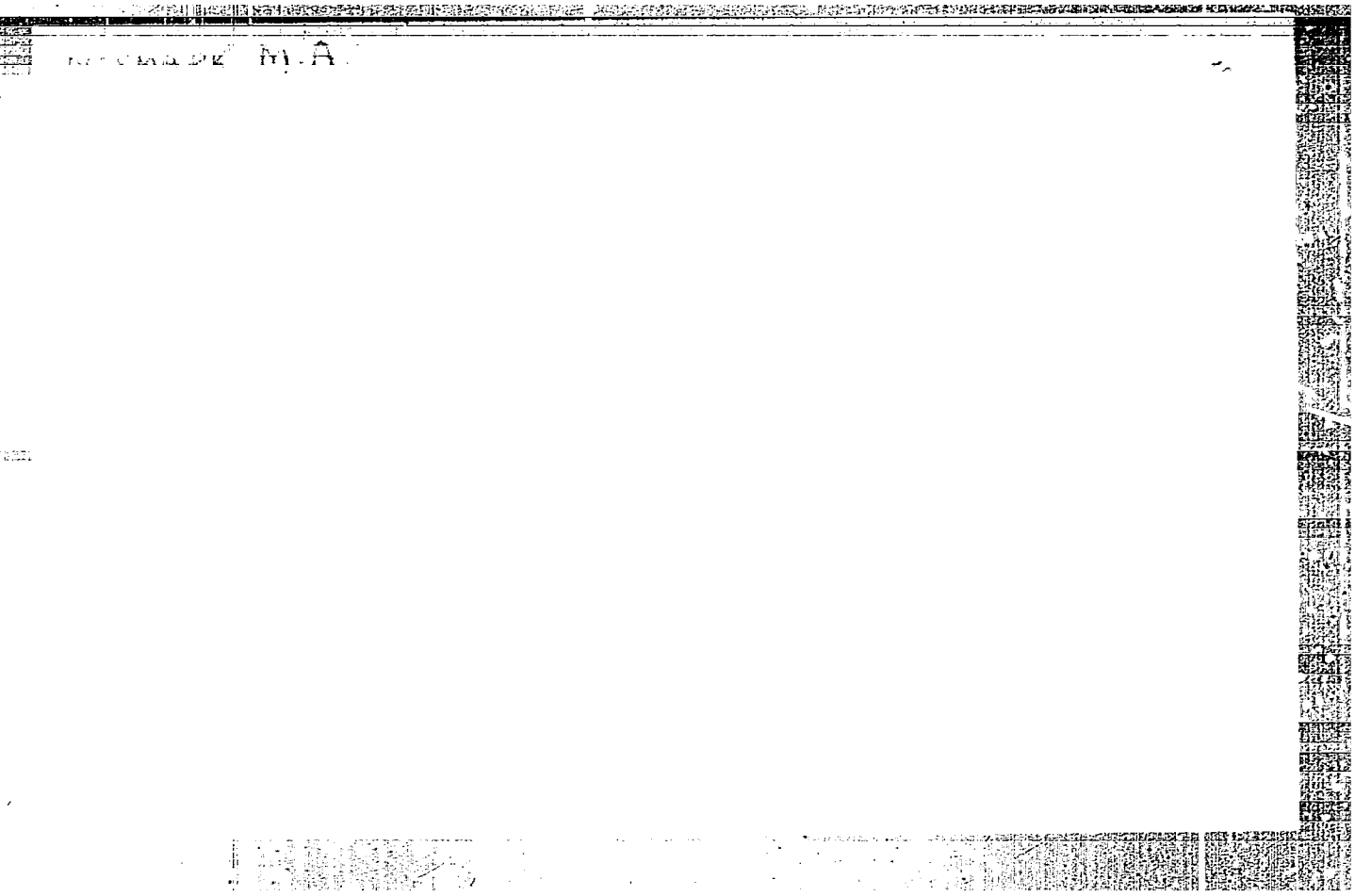

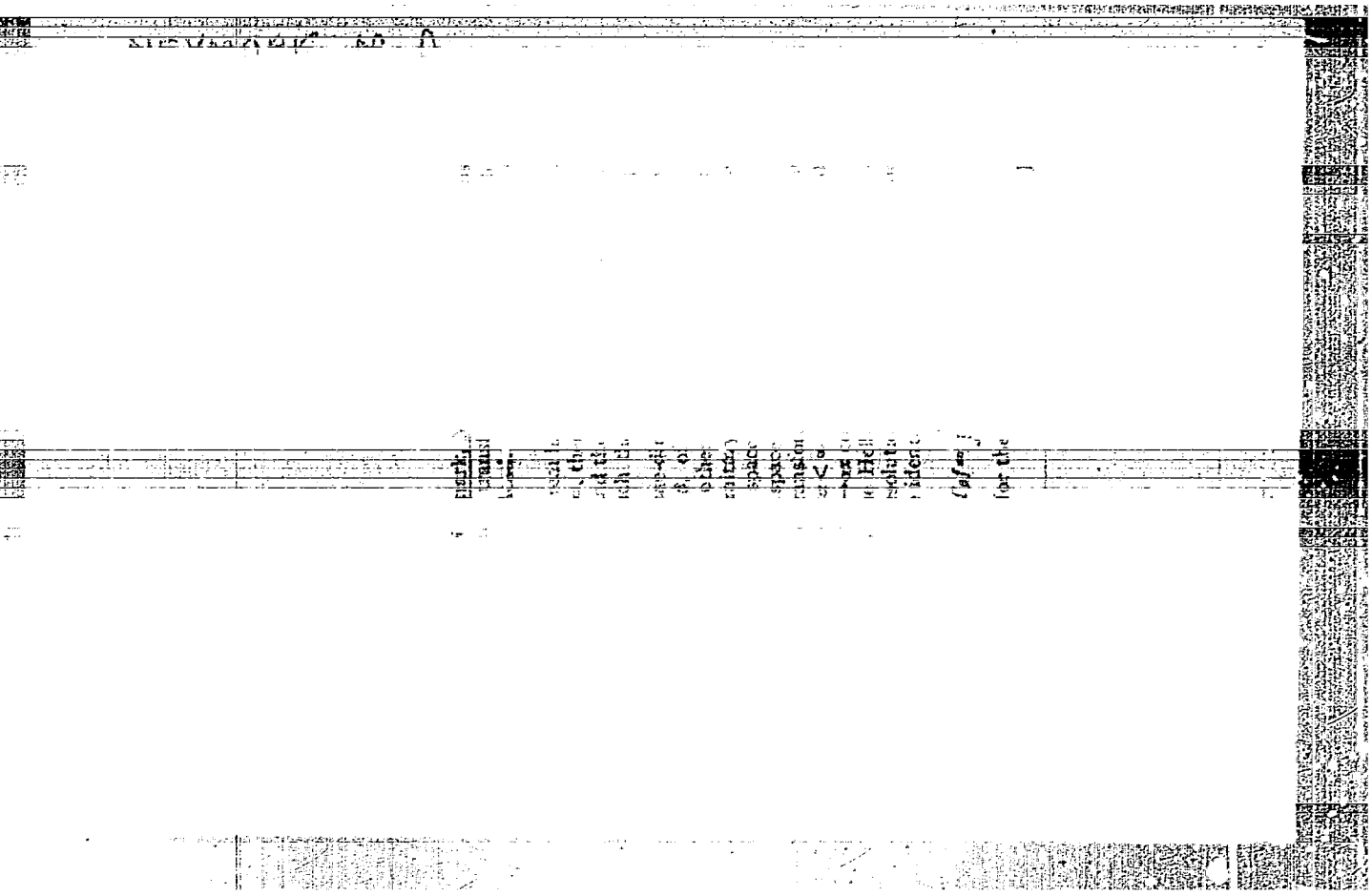

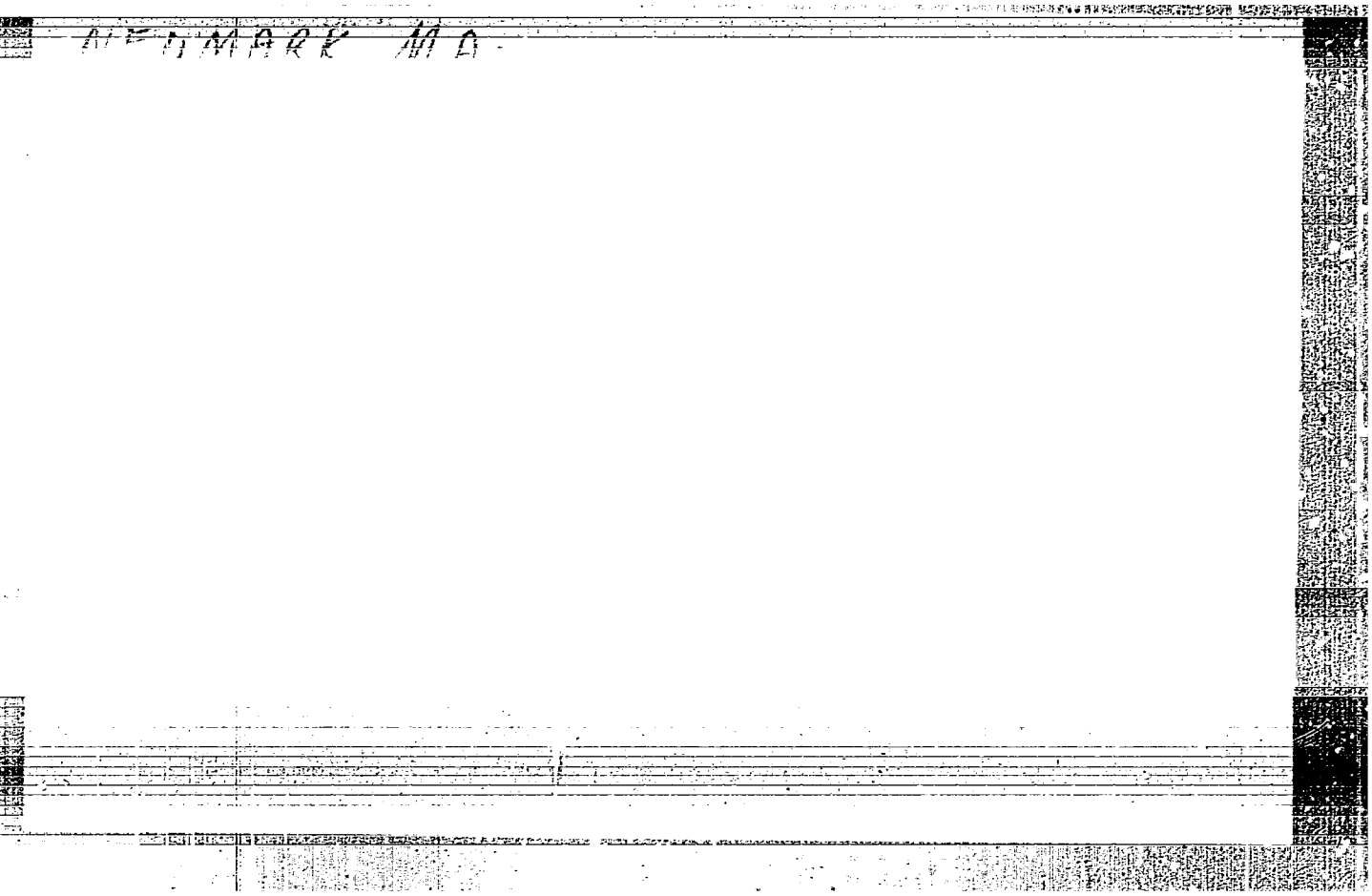

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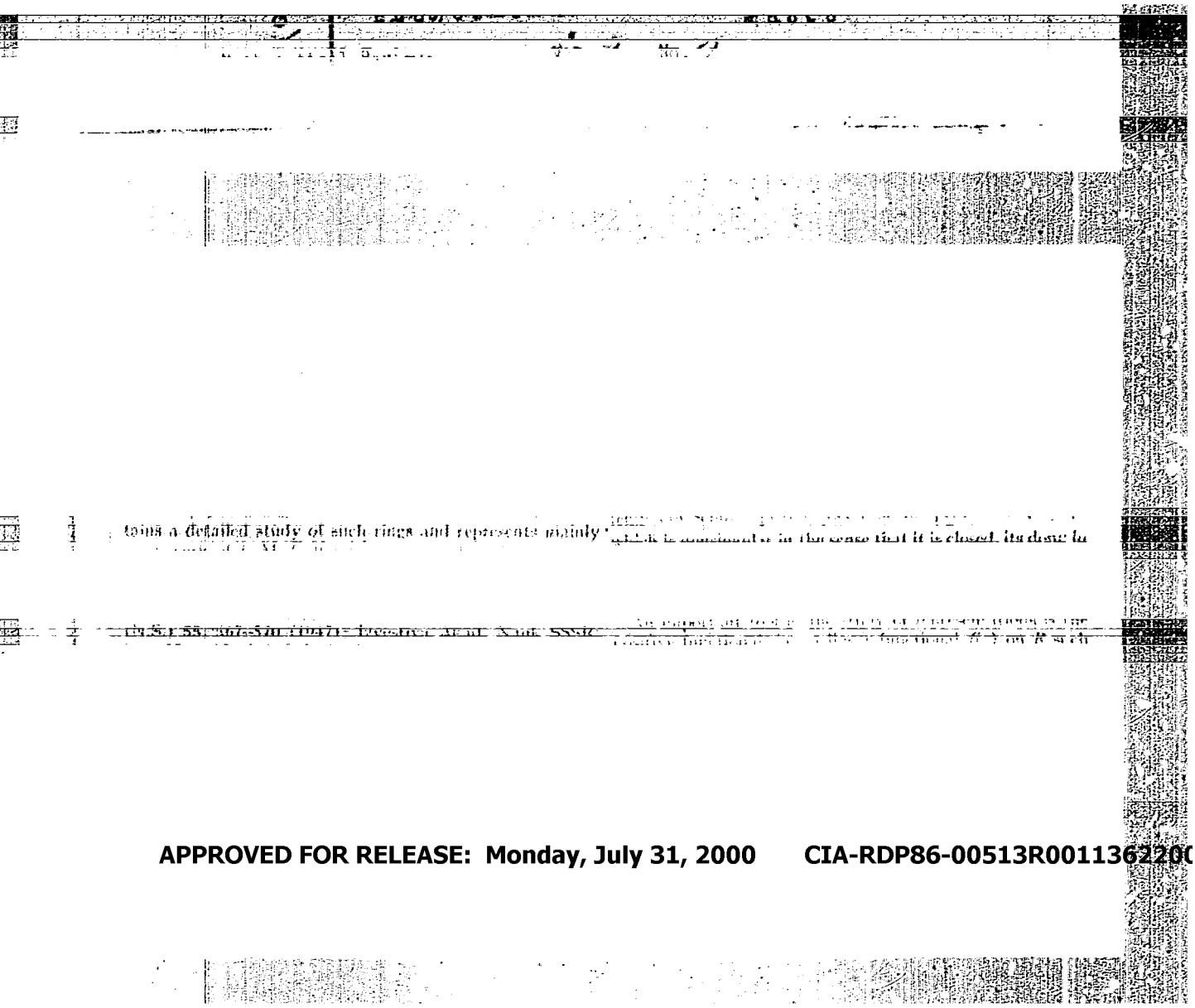

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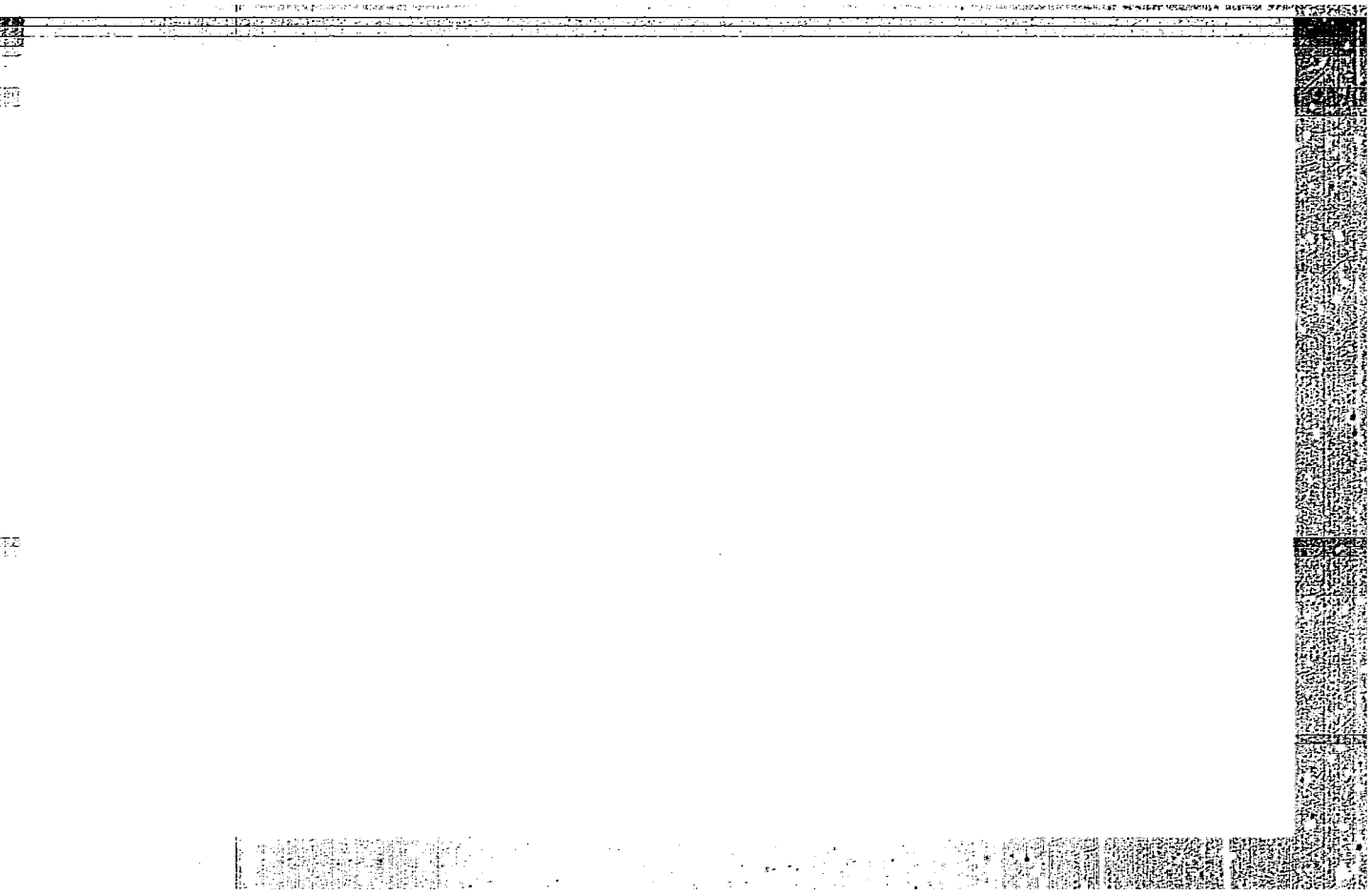

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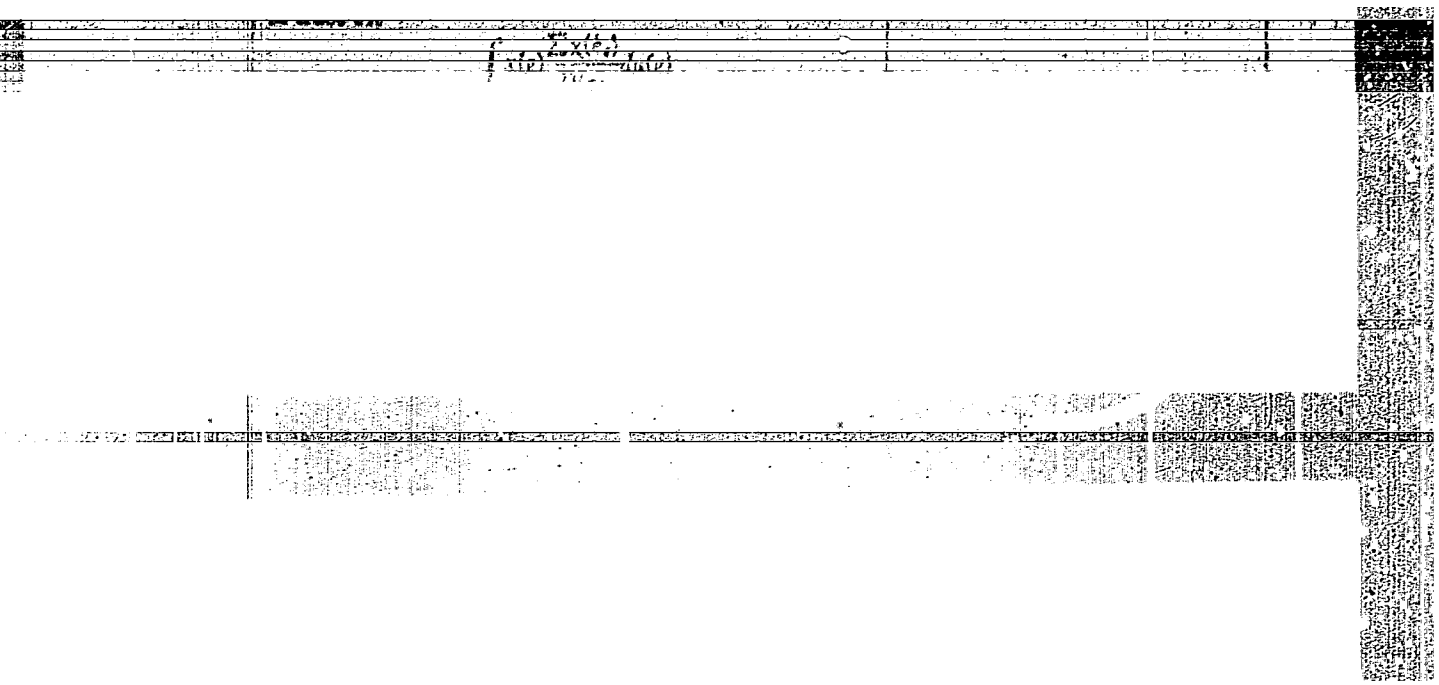

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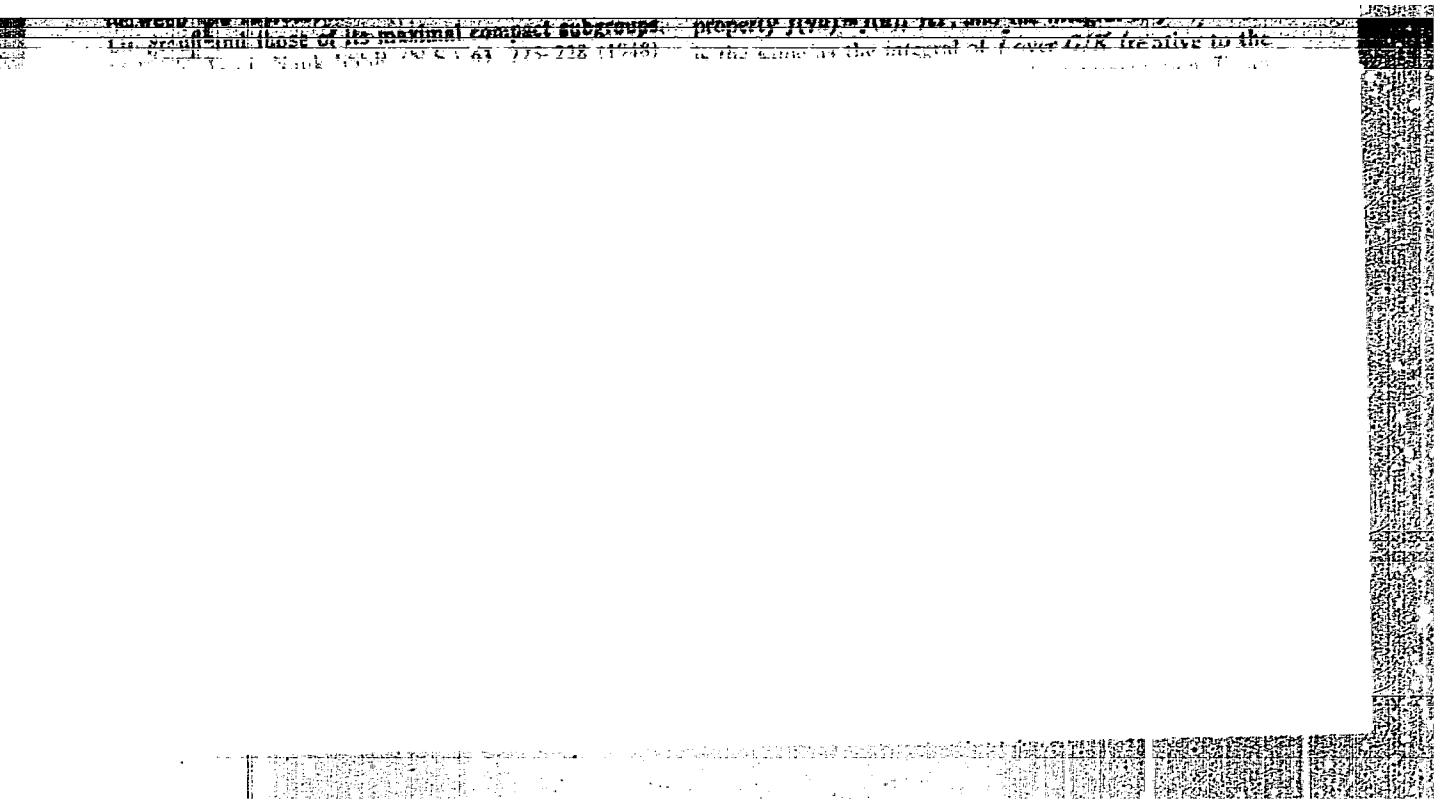

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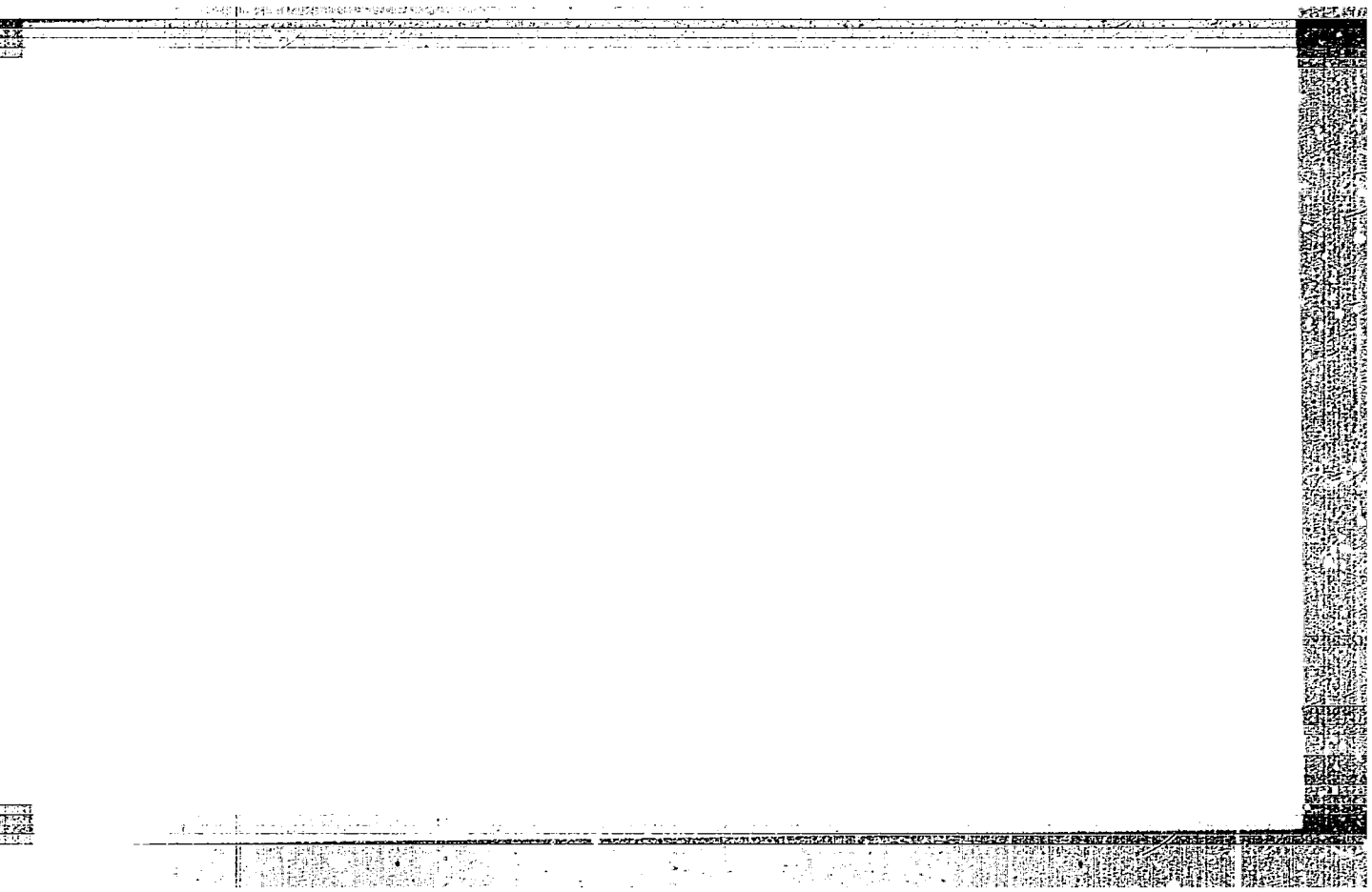

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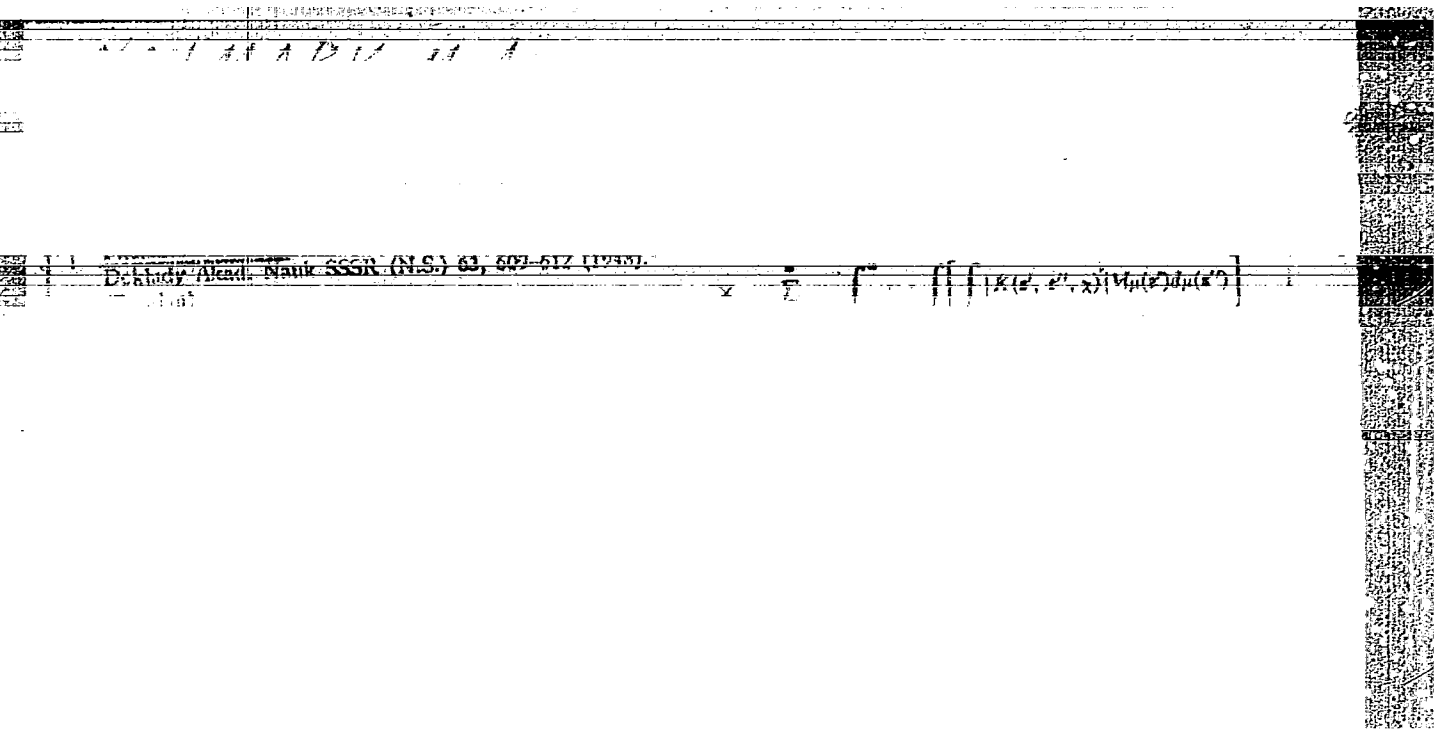
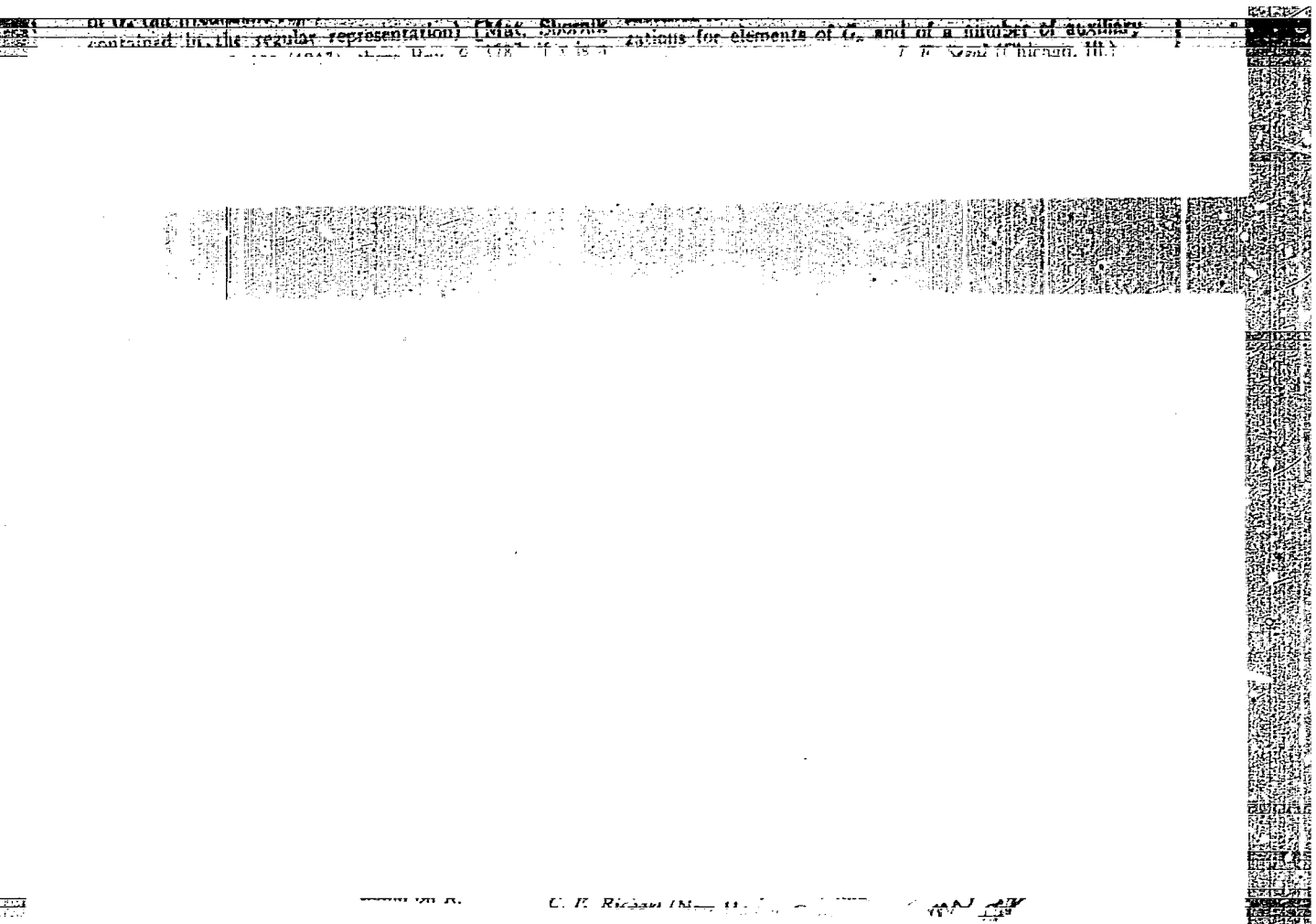




1. M. A. NAYMARK

2. USSR (600)

4. Physics and Mathematics

7. Expansion, in Eigenfunctions, of Differential Equations of Second Order, B. M. Levitan. (Moscow-Leningrad, State Technical Press, 1950). Reviewed by M. A. Naymark, Sov. Kniga, No. 12, 1951.

9. [redacted] Report, U-3081, 16 Jan. 1953, Unclassified.

1. NAYMARK, M. A.

2. USSR (600)

4. Physics and Mathematics

7. Theory of Linear Operators in a Hilbert Space, N. I. Akhiyezer, I. M. Glazman. (Moscow-Leningrad, State Technical Press, 1950). Reviewed by M. A. Naymark, Sov. Kniga No. 6, 1951.

9. Report U-3081, 16 Jan. 1953, Unclassified.

NAIMARK, M. A.

GEL'FAND, I.M.; NAIMARK, M.A.

[Unitary representations of classical groups] Unitarnye predstavleniia klassicheskikh grupp. Moskva, Izd-vo Akademii nauk SSSR, 1950. 288 p. (Akademiia nauk, Leningrad. Matematicheskii institut imeni V.A.Steklova. Trudy. 36) (MLRA 7:6)
(Groups, Theory of)

NAYMARK, M. A.

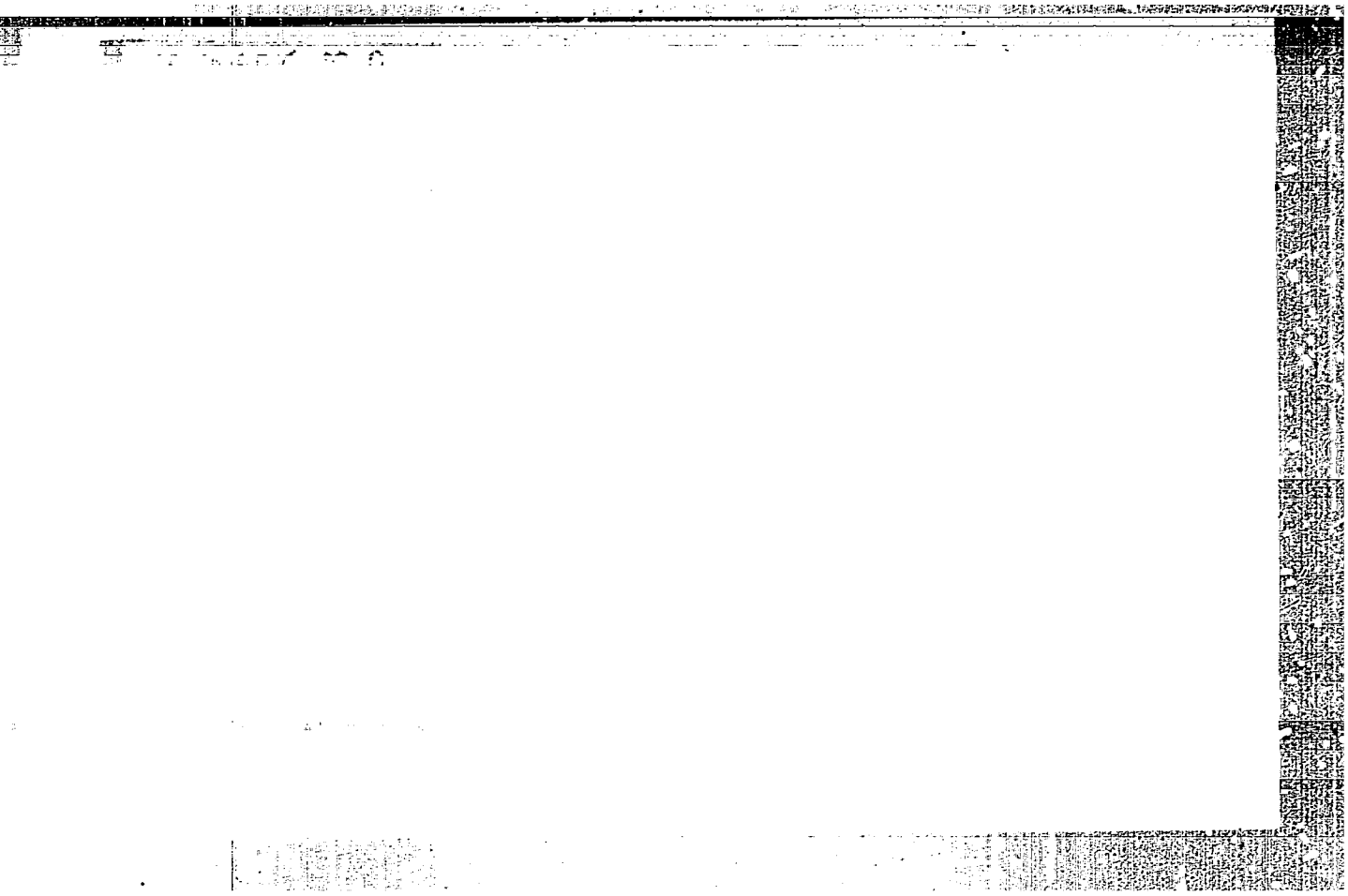
USSR/Mathematics - Bibliography Sep/Oct 51

"Criticism and Bibliography," S. G. Mikhlin, F. D. Gakhov, M. A. Naymark

"Uspekh Matemat Nauk" Vol VI, No 5 (45), pp 206-210

Following 3 books reviewed: (1) V. D. Kupradze, "Boundary-Value Problems of the Theory of Oscillations and Integral Equations," 1950, 4,000 copies, 12.60 rubles; (2) N. P. Vekua, "Systems of Singular Integral Equations and Certain Boundary-Value Problems," Gostekhizdat, 1950, 252 pp, 9.50 rubles; (3) F. R. Gantmakher and M. G. Kreyn, "Oscillational Matrices and Kernels and Small Oscillations of Mechanical Systems," 2d Ed, Gostekhizdat, 1950, 359 pp, 16.50 rubles.

191T100



APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136220

GEL'FAND, I. M.: NAYMARK, M. A.

Groups, Theory of

Unitary representations of a unimodular group containing a single representation of a unitary subgroup. Trudy Mosk., mat. ob., no. 1, 1952

Monthly List of Russian Accessions, Library of Congress, November 1952. UNCLASSIFIED.

Mathematical Reviews
Vol. 14 No. 7
July - August, 1953
Analysis.

Gel'fand, I. M., and Fomin, S. V. Geodesic flows on manifolds of constant negative curvature. Uspehi Matem. Nauk (N.S.) 7, no. 1(47), 118–137 (1952). (Russian)

This paper contains for the most part detailed proofs, extensions and generalizations of results announced previously by the authors [Doklady Akad. Nauk SSSR (N.S.) 76, 771–774 (1951); these Rev. 13, 473]. Thus the main results of the paper concern spectra of geodesic flows on manifolds of constant negative curvature. The following theorem is proved in detail: A geodesic flow in an arbitrary n-dimensional manifold ($n=2, 3$) of constant negative curvature has a Lebesgue spectrum (i.e., all of its spectral measures are equivalent to the ordinary Lebesgue measure). The possible extension of the above theorem to the case of an arbitrary positive integer n is indicated.

The method of proof for the case $n=2$ is to represent the flow on the surface as the coset space G/D of the group G of all real 2×2 matrices of determinant 1 with respect to a suitable discrete subgroup D. The flow is defined by multiplication by $g_t=\begin{pmatrix} e^{-t} & 0 \\ 0 & e^{t} \end{pmatrix}$.

In the case $n=3$, the manifold is represented as the totality of two-sided cosets $h=DgK$ ($g \in G$) of the group G of all complex unimodular matrices of order 2 with respect to a suitable discrete subgroup D and a compact subgroup K. The flow is again defined by multiplication by g_t. Thus the point DgK moves with time t into the point Dgg_tK. In both cases the authors appeal to the complete classification of all unitary representations of the group G [V. Bargmann

1. NAYMARK, M. A.

2. USSR (600)

4. Functional Analysis

7. "Elements of functional analysis." L. A. Liusternik, V. I. Sobolev, Reviewed by M. A. Naymark, Usp.mat.nauk 7 no. 6 1952

Monthly Lists of Russian Accessions, Library of Congress, March, 1953, Unclassfied

NAYMARK, M.A.

Naimark, M. A. On the deficiency index of linear differential operators. Doklady Akad. Nauk SSSR (N.S.) 82, 517–520 (1952). (Russian)

The formal linear differential operator

$$l(y)=(-1)^n(p_0y^{(n)})^{(n)}+(-1)^{n-1}(p_1y^{(n-1)})^{(n-1)}+\cdots+p_ny$$

is considered, where $1/p_0, p_1, \cdots, p_n$ are real, measurable functions on $0<x<+\infty$, and summable on each finite interval $0\leqq x\leqq a$, $a>0$. Since l coincides with its Lagrange adjoint, l gives rise, in a natural way, to a closed symmetric operator L defined on a dense subset of the Hilbert space $L^2(0, \infty)$. Let D_0 denote the set of all functions $y \in L^2(0, \infty)$, vanishing outside closed bounded intervals $\epsilon\leqq x\leqq a$ $(0<\epsilon<a)$, for which $l(y)$ makes sense and $l(y) \in L^2(0, \infty)$. Define L_0 to be the operator with domain D_0, and $L_0(y)=l(y)$, for $y \in D_0$. Then L is the closure of L_0. Since the coefficients in l are real, the deficiency index of L has the form (m, m). It is known [Glazman, same Doklady (N.S.) 64, 151–154 (1949); these Rev. 10, 538; see also Kodaira, Amer. J. Math. 72, 502–544 (1950), esp. pp. 509, 518; these Rev. 12, 103] that $n\leqq m\leqq 2n$ in the above case. The author states (with no proof) six sufficient conditions on the p_i in order that the deficiency index of L be (n, n), or $(n+1, n+1)$. An example is: if there exist constants $a_0\neq 0, a_1, \cdots, a_n$ such that the functions $(1/p_0)-(1/a_0)$, $p_1-a_1, \cdots, p_n-a_n$ are summable on $0<x<\infty$, then the deficiency index of L is (n, n). It is stated that the proofs make use of results on the asymptotic behavior of the solutions of $l(y)=\lambda y$, as $x\to\infty$.

E. A. Coddington.

...ICAL REVIEW (unclassified)
... 3, pp233-240 March 1953

NAYMARK, M. A.

USSR/Mathematics - Modern Algebra, Group Theory 11 Jun 52

"Description of All Irreducible Unitary Representations of Classical Groups," M. A. Naymark

"Dok Ak Nauk SSSR" Vol LXXXIV, No 5, pp 883-886

Gives a complete soln of subject problem for any complex classical group. The basic ideas expounded in the demonstration are combinations of variant and generalized methods described previously by the author and by I. M. Gel'fand, together with certain new results of an algebraic nature and with certain new evaluations of the norm in a group ring. Submitted by Acad A. N. Kolmogorov 18 Apr 52.

223T73

USSR/Mathematics - Operators, Non-Self-Adjoint 1 Jul 52

"Spectrum of Singular Non Self-Adjoint Differential Operators of the Second Order," M. A. Naymark

"Dok Ak Nauk SSSR" Vol LXXXV, No 1, pp 41-44

Considers the differential expression $L(y) = -y'' + p(x)y$ ($0 \leq x < \infty$), where $p(x)$ is a complex function summable in each finite interval $(0,a)$, $a > 0$. Using this differential expression the author constructs in the Hilbertian space $L_2(0,\infty)$ a linear operator. The object of this article is to expound certain results concerning the spectrum of operator L_θ in the case of complex $p(x)$ and theta θ for various

224T87

assumptions concerning $p(x)$ (the operator L_θ is constructed from the operator L according to $L_\theta y = L(y)$). Submitted by Acad M. V. Keldysh 29 Apr 52.

224T87

NAYMARK, M.A.

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136220(

(1)

Naĭmark, M. A. Investigation of the spectrum and expansion in eigenfunctions of singular nonselfadjoint differential operators of the second order. Uspehi Matem. Nauk (N.S.) 8, no. 4(56), 174–175 (1953). (Russian)

A number of results are stated concerning the spectrum of the operator L_θ associated with $l(y)=-y''+p(x)y$ on $0\leqq x<\infty$ with boundary condition $y'(0)-\theta y(0)=0$ where the function p is complex-valued and θ is a complex constant. If $\int_0^\infty|p(x)|dx<\infty$, the spectrum of L_θ is continuous on the half-line $\lambda\geqq 0$ and otherwise discrete; the eigenvalues form a bounded set in the λ-plane with limit points on $\lambda\geqq 0$ only. If

(a) $\quad p(x)\to\infty \quad$ as $\quad x\to+\infty$;

(b) $\quad |p|'=O(|p|^\alpha), \quad 0<\alpha<3/2$;

(c) $\quad |p'|=O(|p|'), \quad |p''|=O(|p|'')$;

(d) $\quad 0\leqq\arg p(x)\leqq\gamma, \quad \gamma<\pi$,

then the spectrum is discrete and has no finite limit points. If (a), (b) and (c) hold and if $0\leqq\arg p\leq\pi$, if

$$\mathrm{Re}\,(p^1)=o(p^{-1}), \quad 0\leqq\arg p^1\leqq\pi/2,$$

and if $\int_0^\infty|p|^{-1}dx=\infty$, then the continuous spectrum fills the whole real axis and for other values of λ the spectrum can only be discrete. Other results are stated.

N. Levinson (Cambridge, Mass.).

Mathematical Review.
June 1954
Analysis

10-7-54
LL

NAYMARK, M. A. 11 Mar 53

USSR/Mathematics - Eigenfunctions

"Expansion, in Eigenfunctions, of Non Self-Adjoint Singular Differential Operators of Second Order," M.A. Naymark

DAN SSSR, Vol 89, No 2, pp 213-216

Refers to problem treated by H. Weyl (Math. Ann. 68,222 (1910) and gives soln of the differential operator $L(y) = -y'' + p(x)y$ for the particular case where the function $x^2p(x)$, usually complex, is summable in the interval $(0,\infty)$. Presented by Acad M. V. Keldysh. Recd 23 Dec 52.

Source #264T89

NAYMARK, M. A.

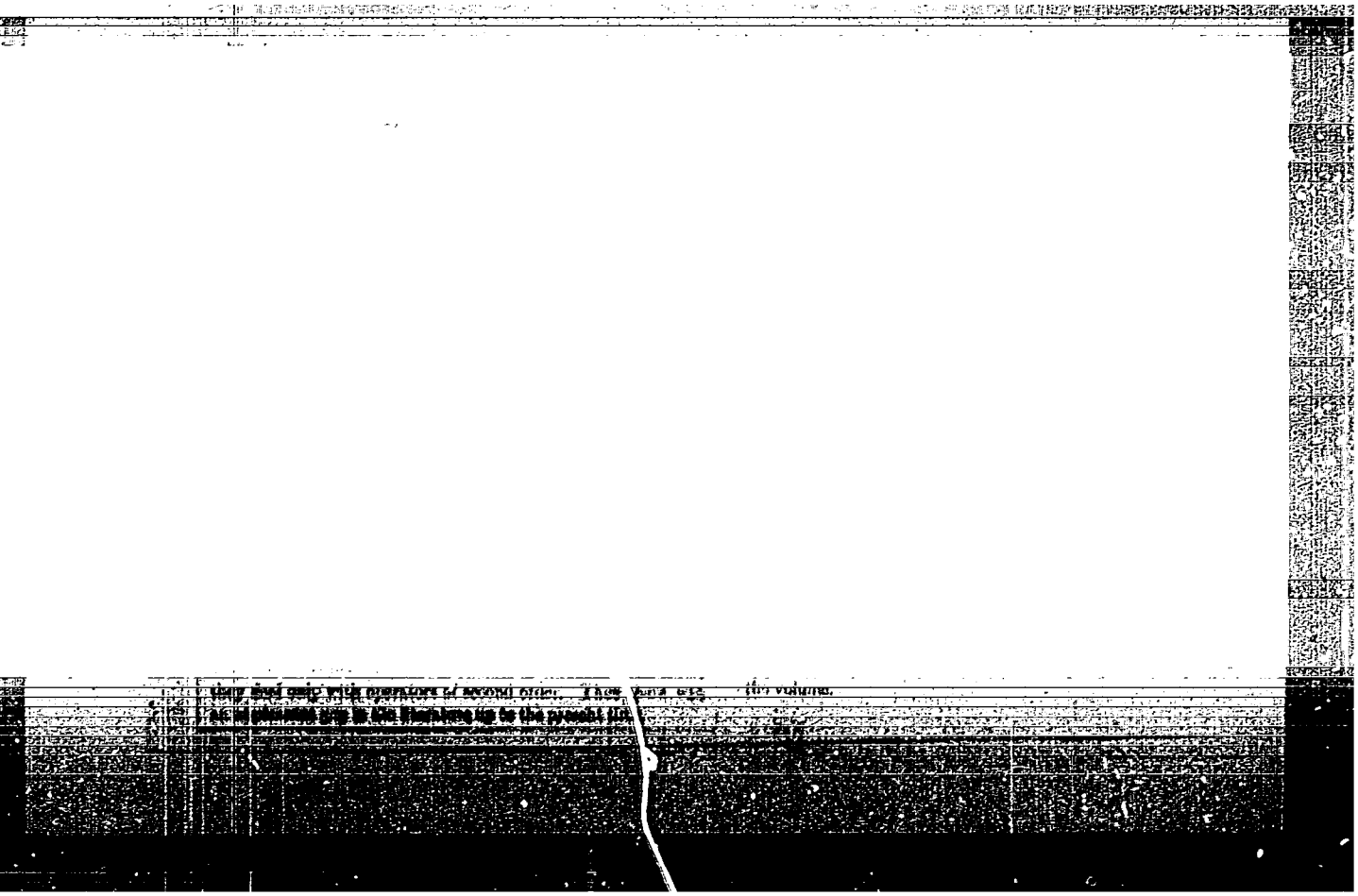
USSR/Physics - Resonator Equations 1 Aug 53

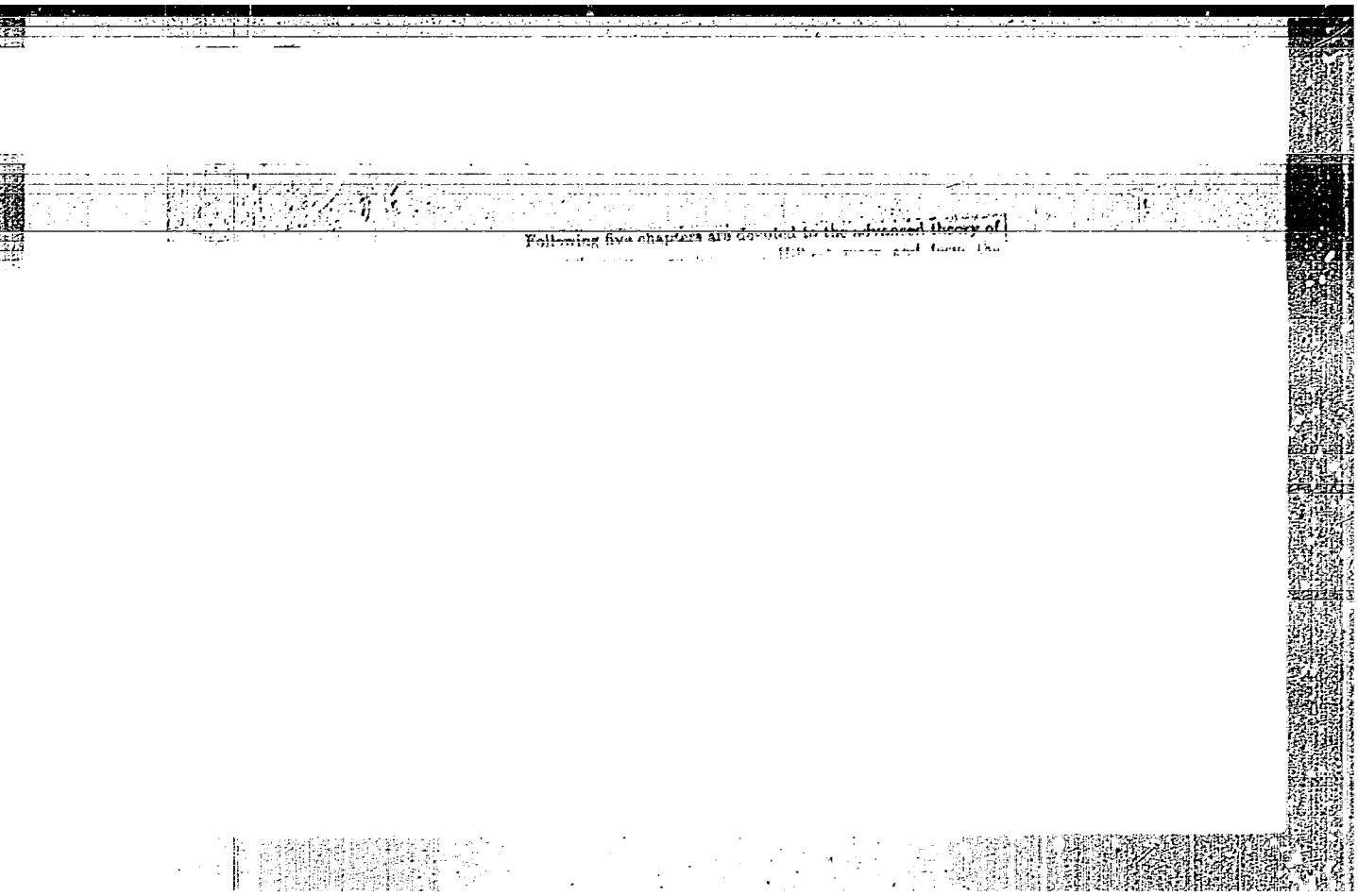
"Eigenfunctions of Real Resonators," V. M. Vakhnin

DAN SSSR, Vol 91, No 4, pp 779-782

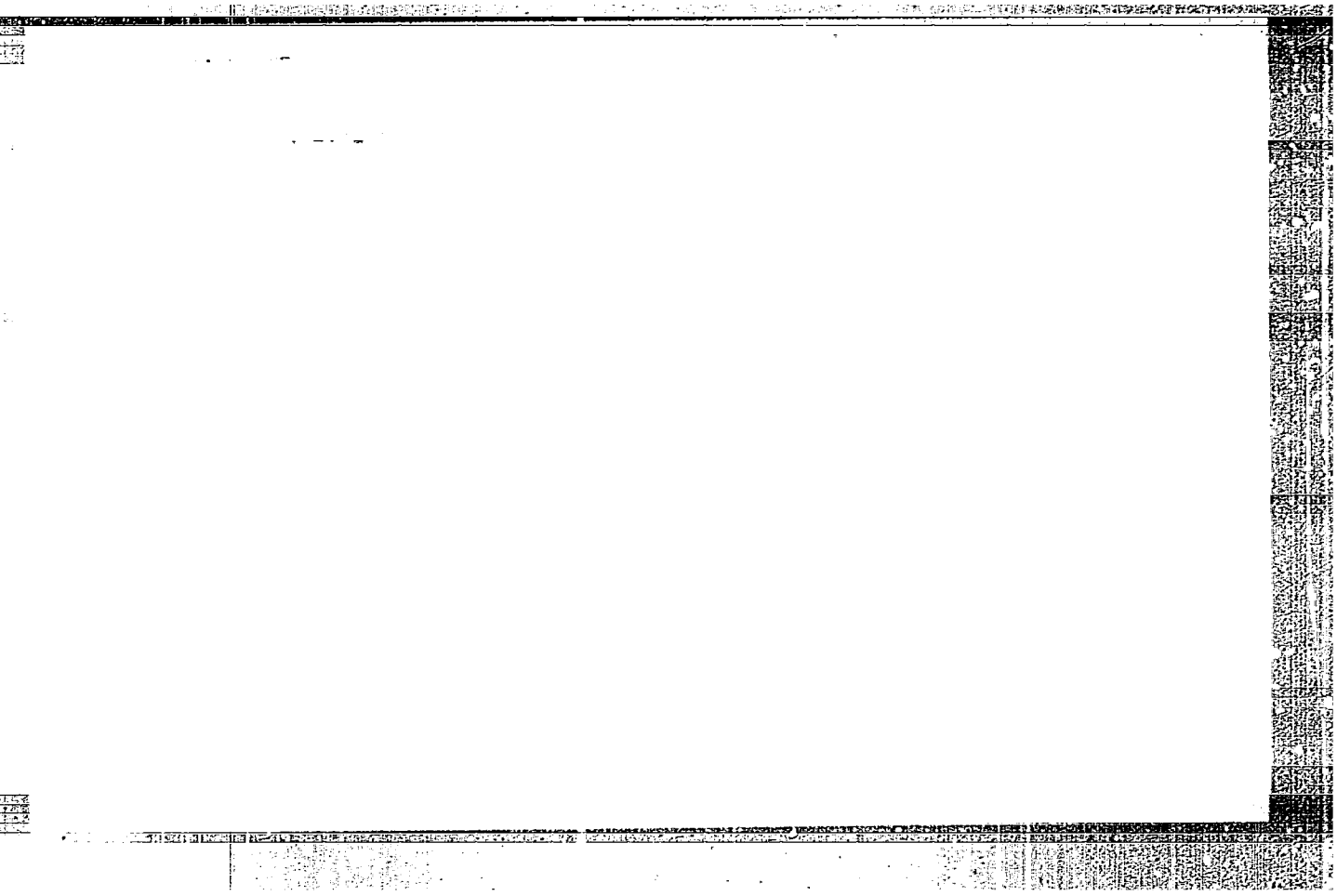
Continuation of work by M. V. Keldysh (DAN SSSR 77, Nos 1 and 2 (1951) and M. A. Naymark (DAN SSSR, 85, 1 (1952)) in mathematical theory of non self-conjoint eqs. Prove that application of eigenfunction of real resonator secures better accuracy in solution of some practical problems, than method of skin effect. Presented by Acad M. V. Keldysh 3 Jun 53.

272T82





Following five chapters are devoted to the advanced theory of



APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136220

Naymark, M.A.

Category : USSR/ Theoretical Physics - Theory of Relativity and Unified Field Theory B-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 151

Author : Naymark, M.A.
Title : Linear Representations of the Lorentz Group

Orig Pub : Uspekhi matem. nauk, 1954, 9, No 4, 19-93

Abstract : A systematic exposition, intended for a wide circle of readers (mathematicians and physicists), of the theory of irreducible representations of the Lorentz group. The article contains the theory of both the finite-dimensional and of the infinite-dimensional unitary representations of the Lorentz group developed in the works by I.M. Gel'fand and the author. Contents: 1. Fundamental concepts; 2. Infinitesimal operators of the linear representation of the Lorentz group proper; 3. Determination of the infinitesimal operators for the representation of the $\mathfrak{U}_4$ group; 4. Finite-dimensional representations of the Lorentz group proper; 5. Basic series of representations of group $\mathfrak{U}$; 6. Description of the representation of the basic series with the aid of the unitary subgroup; 7. Supplementary and total series of representations of the group $\mathfrak{U}$.
From: Referat. Zhurnal Matematika, 1956, 3153

Card : 1/1

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R001136220

NAYMARK, M. A.

USSR/Mathematics - Lorenz group (topology)

Card 1/1 : Pub. 22 - 6/44

Authors : Naymark, M. A.

Title : About non-reducible linear presentation of the proper Lorenz group

Periodical : Dok. AN SSSR 97/6, 969-972, Aug 21, 1954

Abstract : A theorem on the Lorenz group is proved. The theorem is stated as follows: any wholly non-reducible linear presentation of the group A (Lorenz) is equivalent either to one of the wholly non-reducible presentations, or to one of the "spinner" presentations of the group. Definitions of series of wholly non-reducible presentations and of a "spinner" presentation of the group A are given. Four references (1946-1952).

Institution : .....

Presented by : Academician A. N. Kolmogorov, May 21, 1954

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TITLE A continuous analogue to the Schur's lemma.
A continuous analogue to the Schur's lemma and its application for the complex classic groups.
PERIODICAL Doklady Akad. Nauk 98, 185-188 (1954)
Izvestija Akad. Nauk, Ser. mat. 20, 3-16 (1956)
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The following theorem is proved: Let $\mathfrak{U}$ be a local-compact space, H a Hilbert space and R the totality of those functions of $\mathfrak{U}$ in the set of complete-continuous operators of H which are continuous in the uniform topology and which tend to zero in infinity. Further let $\mathfrak{H}$ be the continuous direct sum of the Hilbert spaces identified canonically with H, relative to a measure given on $\mathfrak{U}$ such that R becomes a set of operators in $\mathfrak{H}$. Then an operator being exchangeable with all operators of R is decomposable and possesses scaler components. Now let G be a complex classical group and $x(g)$ a sufficiently regular function on G. For a character χ of the group D of the diagonal matrices of G let T_g^{χ} denote the corresponding irreducible unitary representation of G in the Hilbert space of those functions being quadratic integrable relative to the invariant measure on the unitary subgroup U of G, which satisfy the equation $f(\gamma u) \equiv \chi(\gamma)\, f(u)$ $(\gamma \in U \cap D,\ u \in U)$. We put

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$$T_{\chi}^{K} = \int_{G} x(g)\, T_{g}^{K}\, d\mu(g)$$

($d\mu(g)$ is the Haar's measure on G). Then, as is well known, the operator T is generated by a Hilbert-Schmidt kernel $K_x(u_1,u_2,\chi)$ and we have the following analogue to the Plancherel formula:

$$\int_{G} |x(g)|^2 d\mu(g) = \int_{\chi_e} \left[\iint_{U} |K_x(u_1,u_2,\chi)|^2 d\mu(u_1) d\mu(u_2) \right] \omega(\chi) d\mu(\chi)$$

(u_1,u_2 elements of U, $d\mu(u), d\mu(\chi)$ invariant measure on U resp. on the character group X of D, X_e a suitable open subset of X, $\omega(\chi)$ a certain positive function). As an application of the above theorem the author proves that the isometry given by the relation $x(g) \longrightarrow K_x(u_1,u_2,\chi)$ maps the space of the functions being quadratic integrable on G to the space of all $K(u_1,u_2,\chi)$ with

$$\int_{\chi_e} \left[\iint_{U} |K(u_1,u_2,\chi)|^2 d\mu(u_1) d\mu(u_2) \right] \omega(\chi) d\mu(\chi) < +\infty.$$

This problem, until now, was unsolved in the investigations of I.M.Gel'fand and M.A. Najmark (Unitary representations of the classic groups, Moscow-Leningrad (1950) p.202).

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Naĭmark, M. A. On some criteria of completeness of the system of eigen and adjoint vectors of a linear operator in Hilbert space. Dokl. Akad. Nauk SSSR (N.S.) 98, 727–730 (1954) (Russian)

Two general results are proved concerning the completeness of the system of eigen and adjoint vectors of non-self-adjoint operators having discrete spectra.

Theorem 1: Let A be a closed linear operator, defined on a dense linear space in the Hilbert space H, whose resolvent R_λ is completely continuous. Let there exist a dense subset S of H and a sequence of circumferences Γ_n with centers at the origin having the properties (1) on Γ_n there is no eigenvalue of A, (2) the radii of the Γ_n tend to infinity, (3) for all $f \in S$ the resolvent R_λ satisfies

$$\max_{\lambda \in \Gamma_n} \|R_\lambda f\| \to 0 \quad \text{as} \quad n \to \infty.$$

Then the system of eigen and adjoint vectors of A are complete in H.

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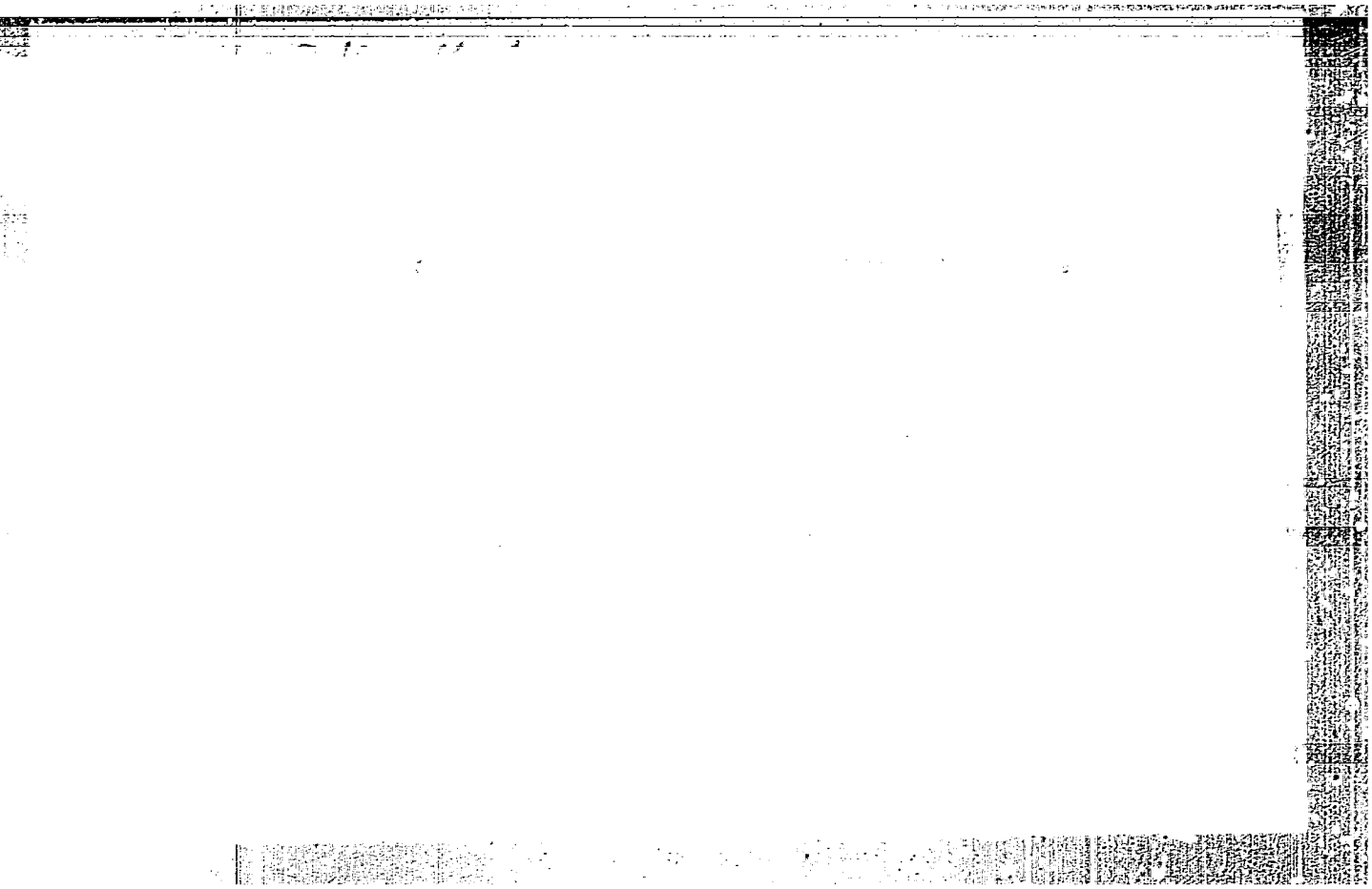
Theorem 2: Let A, Γ_n, S be the same as in Theorem 1, and let B be a linear operator in H such that: (1) $S \subset D_A \cap D_B$, where D_A, D_B are the domains of A and B; (2) for all sufficiently large n and $\lambda \in \Gamma_n$, (a) $(A+B-\lambda I)S$ is dense in H, (b) $\|R_\lambda B f\| \leq q\|f\|$ for all $f \in S$, where $q<1$. Then $A+B$ has a closure C, the resolvent of C is completely continuous, and the system of eigen and adjoint vectors of C is complete in H.

These results are applied to the case of singular differential operators to obtain the following result: Let σ be an essentially bounded measurable complex-valued function on $0 \leq x < \infty$, ϑ a real number. For $k>2$ the spectrum of the operator L, generated by the differential expression $l(y) = -y'' + (x^k + q(x))y$ and the boundary condition $y'(0) - \vartheta y(0) = 0$, is discrete. The resolvent of L is completely continuous, and the set of eigen and adjoint vectors of L are complete in $L_2(0, \infty)$. [For definitions and previous results of this nature see M. V. Keldyš, same Dokl. (N.S.) 77, 11–14 (1951), MR 12, 835.] *E. A. Coddington.*



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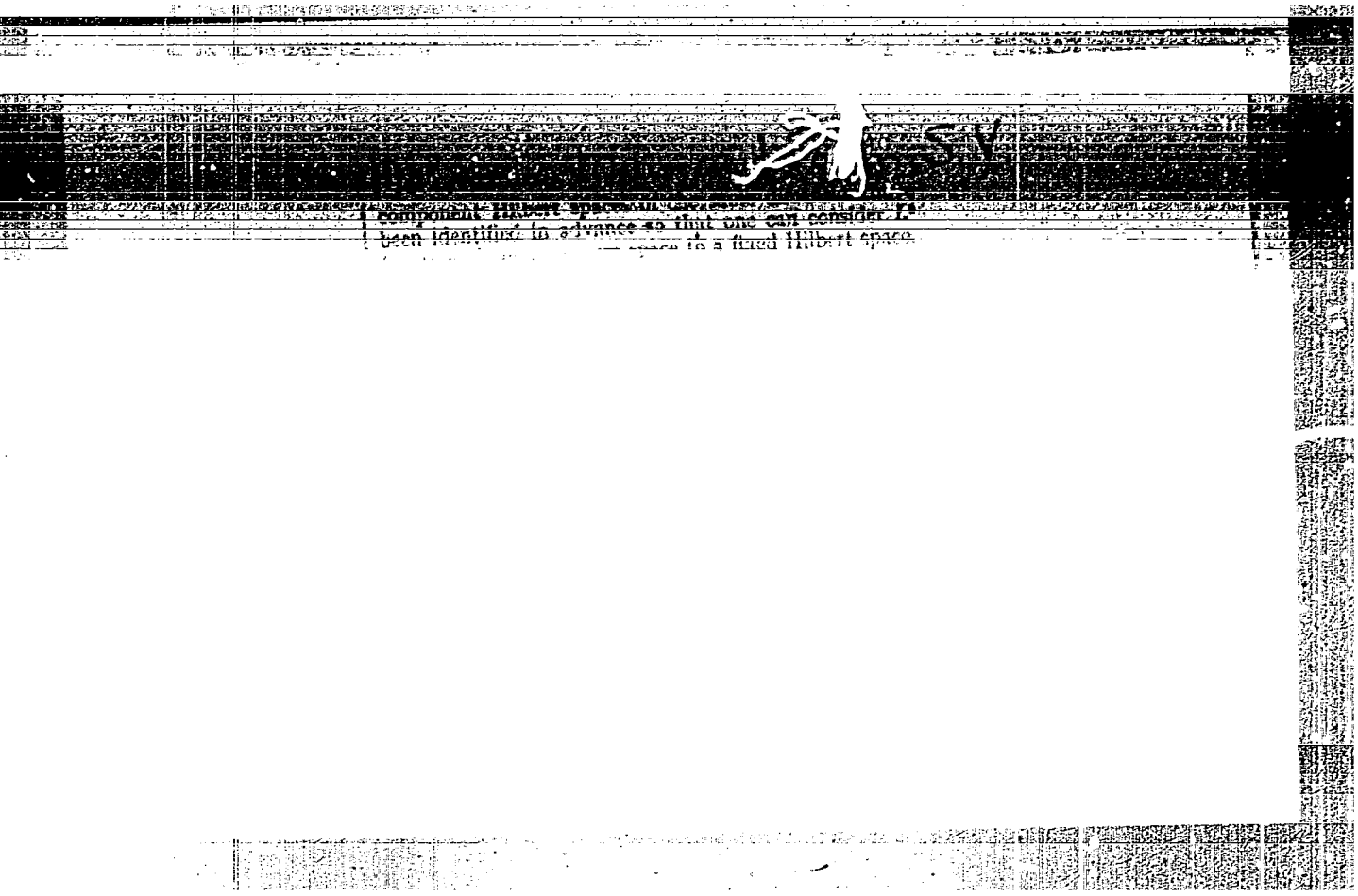

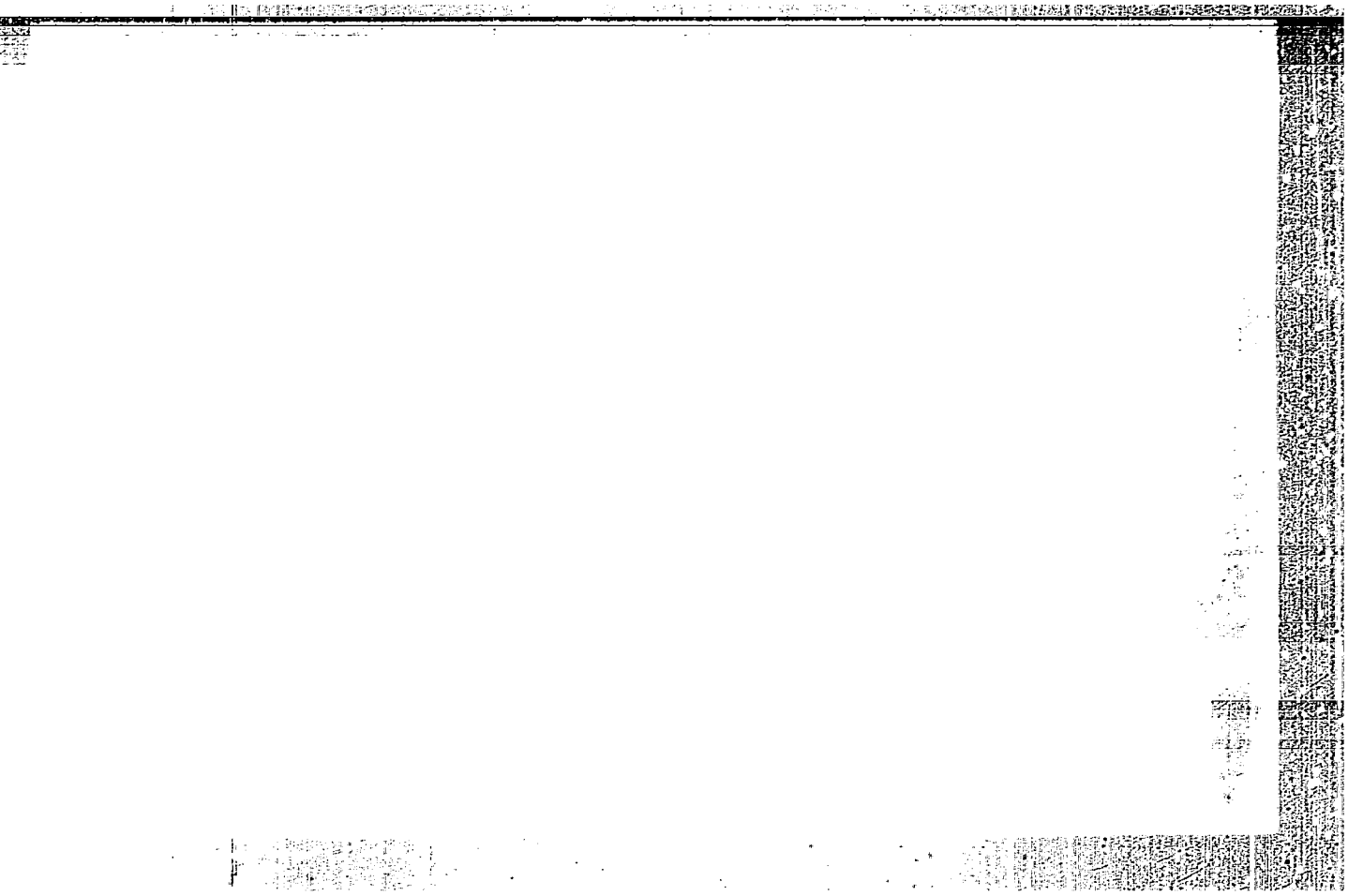

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