diagrams which leads to the virtual production of a pair of particles with contrary impulses and spins. The author refers to the analogy of the theory of superfluidity. Then new Fermi amplitudes are introduced. The diagrams received in higher approximation are also given. In the expansions of the perturbation theory used here there is no term with a dangerous energy denominator. The asymptotic form of the solution for low g can easily be found and is also given here. Then the author calculates the energy of the ground state in second approximation. The difference Δ E between the energy of the ground state and that of the normal state is also calculated. Then a formula for the energy of the elementary excitations is constructed in the approximation used here. The energies of the excited states are separated by a gap from the ground state. The "current ground state" is investigated, that is the state with the least energy among all possible states with an given momentum p. The reflections given here show that there is a superconductivity in the model investigated here. The Coulomb interaction counteracts the occurrence of superconductivity.

A New Method in the Theory of Superconductivity 56-1-10/56

There are 2 figures, and 6 references, 1 of which is Slavic.

ASSOCIATION: Mathematical Institute of the AN USSR (Matematicheskiy institut Akademii nauk SSSR).

SUBMITTED: October 10, 1957

AVAILABLE: Library of Congress

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BOGOLYUBOV, N. N.

AUTHOR: Bogolyubov, N. N. 56-1-12/56

TITLE: A New Method in the Theory of Superconductivity. III. (O novom metode v teorii sverkhprovodimosti. III).

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 1, pp. 73-79 (USSR)

ABSTRACT: Lately good results have been achieved in the solutions of the problems of statistical physics by the method of summing up the most important diagrams. The present paper shows that in the theory of superconductivity it is possible by means of this method to obtain those results which in the first two papers of this series (references 1,2) were received by canonical transformation and by the principle of compensating the diagrams with a "dangerous" energy denominator. According to Tolmachev and Tyablikov (refrence 2) it is possible to investigate the Bardin-Hamiltonian instead of that of Fröhlich, which is much simplier. The Bardin Hamiltonian from which the author proceeds is given in an explicit form. The total number of electrons is taken into consideration by help of the chemical potential λ. An important part is played by the diagrams of a certain type

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described here. They are summed up here by the method of the approximated second quantization, that is by the construction of a simplified Hamiltonian which contains only diagrams of such a class, which are desired in the summing up. The problem of the summation of a special class of diagrams for the Hamiltonian mentioned above is equivalent to that of a certain model-like dynamic system. Then the author constructs the exact asymptotic solution of this problem, where only those values are neglected which disappear at the limit V $\rightarrow$ O. A wave function C is also investigated for which all filling numbers are zero. This wave function is the exact asymptotic eigenfunction of the Hamiltonian H. Next the stability of the state C is investigated. For the determination of the energy E of the elementary excitation a secular equation is given. All E values are positive and separated from zero by a gap. As in the two previous papers of this series (references 1,2) the same Barden,

A New Method in the Theory of Superconductivity. III. 56-1-12/56

results are received. The method of summing up the diagrams is very illustrative and offers the establishment of a connection to the ideas of the work of J. Barden, L. N. Cooper, J. R. Schrieffer (Bardin, Kuper, Shriffer) (reference 3). According to the author, however, the method of canonical transformation is more elastic as it makes possible not only the calculation higher approximations but also to investigate different generalizations (for instance for the calculation of thermodynamic values).
There are 2 figures, and 4 references, 3 of which are Slavic.

ASSOCIATION: Mathematical Institute AN USSR (Matematicheskiy institut Akademii nauk SSSR).

SUBMITTED: October 17, 1957.

AVAILABLE: Library of Congress

Card 3/3

AUTHOR: Bogolyubov, N. N., Member of the Academy 2o-119-1-13/52

TITLE: On the Problem of the Condition for Superfluidity in the Theory of Nuclear Matter (K voprosu ob uslovii sverkhtekuchesti v teorii yadernoy materii)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 1, pp. 52-55 (USSR)

ABSTRACT: The author investigates here the model-like dynamic system with the Hamiltonian $H = \sum_{k,\sigma} \{ E(k) - E_F \} \alpha^+_{k\sigma} \alpha_{k\sigma} + (1/2V) \sum_{(k,k',\ldots,\sigma\ldots)} J(k,k' | \sigma_1, \sigma_2, \sigma'_2, \sigma'_1) \alpha^+_{k\sigma_1} \alpha^+_{-k\sigma_2} \alpha_{-k'\sigma_2} \alpha_{k'\sigma'_1}$ to apply it to the theory of nuclear matter. Here in order denotes: σ denotes a discreet index, which e. g. characterizes the spin and the isotope spin; E_F - the "Fermi energy" - a parameter, which plays the rôle of the chemical potential; V - the volume of the system.

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On the Problem of the Condition for Superfluidity in the Theory of Nuclear Matter

2o-119-1-13/52

The incompleteness the "model-likeness" of such a Hamiltonian is explained by the fact that in it only the interactions of the particle pairs with opposite momenta are considered. The Hamiltonian then is transformed by introduction of new parameters. It is shown that the ground state in the here examined scheme for the process of the limit transition $V \rightarrow 0$ can be exactly ascertained asymptotically. Here the method, described in a communicytion by D. N. Zubarev and Yu. A. Tserkovnikov (Reference 1), is conviniently applied and the Hamiltonian is written down in the form $H = U_0 + H_0 + H_1$. In case of the Hamiltonian H_0 the ground state C_0 is a vacuum state for the new Fermion amplitudes. The contribution to the ground state, which originates from H_1, becomes negligiblates small in case of $V \rightarrow 0$ compared with the contribution, which originates from $U_0 + H_0$. By a suitable choice of two here occurring functions can be attained that

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the mean value $\overline{H} = \langle C_o^* H C_o \rangle$ represents asymptotically exactly the energy of the ground state for the here examined Hamiltonian H. Then a report is given on the factual determination of u and v. Then the author discusses the index system, employed in the ansatz of the Hamiltonian. The here ascertained equation can be used as a criterion for the instability of the normal state in the investigation of the problem of superfluidity of nuclear matter. The here given considerations can also be used for the computation of the free energy at a temperature differing from zero. On that occasion quite complicated non-linear equations are obtained, but the equations for the determination of the critical temperature of the phase transition here also will be linear. There is 1 reference, which is Soviet.

SUBMITTED: January 7, 1958

Card 3/3

AUTHOR: Bogolyubov, N. N, Member, Academy of Sciences, USSR 20-119-2-13/60

TITLE: A Variation Principle in the Problem of Many Bodies (Ob odnom variatsionnom printsipe v zadache mnogikh tel)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 2, pp. 244-246 (USSR)

ABSTRACT: The author investigates a dynamic system of Fermi particles with a Hamiltonian of the form

$H = \sum \{T(ff') - \lambda \delta_{ff'}\} a_f^* a_{f'} + (1/2) \sum \Phi(f_1, f_2, f_2', f_1) a_{f_1}^* a_{f_2}^* a_{f_2} a_{f_1}$, where

λ denotes the chemical potential; a, a^* the Fermi amplitudes; f the totality of parameters characterizing the state of a particle. The author carries out the following transformation of Fermi amplitudes:

$a_f = \sum_\nu (u_{f\nu} \alpha_\nu + v_{f\nu} \alpha_\nu^+)$.

Then he mentions the orthonormality conditions for it

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in order to render this transformation canonical and in order not to violate the commutation properties of the fermi amplitudes. Then u and v are determined from a minimum condition of the form $\mathcal{E}(u, v)$ taking into account the above mentioned orthonormality condition, and then the corresponding equation of continuity is put down. Then the author formulates the new approximation method for the many-body problem. In this method such u and v are chosen which satisfy the equation of continuity which yield a minimum value of the form $\mathcal{E}(u, v)$. Here $\mathcal{E}(u, v)$ is regarded as energy of the ground state. As the problem of the basic formulation and of the applicability of this method is rather complicated the author restricts himself to some remarks. Based on a previous work of the author (reference 1) it can be maintained that the method suggested here yields an exact solution, when in the Hamiltonian only the interactions of particle pairs with opposite momenta are taken into account. Among the solutions of the equation of continuity there is always

one solution which corresponds exactly to the known Fock (Fok) method. The author divides the totality of parameters ν into 2 parts, F and G. The number of parameters ν consisting of N elements (N denoting the number of particles) is taken as F (Fermi sphere); the residual ν are united to an additional set G. Using one of the here mentioned arrangements all conditions of orthogonalita are satisfied. In a special case shortly discussed here the method discussed here means nothing else but the Fock (Fok) method. Thus the discussed method can be regarded as generalization of Fock's (Fok) method and the limits of its applicability are at least not more restricted than those of the Fock (Fok) method. The method discussed here can be further developed and precized by investigating the system of equations for the distribution functions. There is 1 Soviet reference.

SUBMITTED: January 1, 1958
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A Variation Principle in the Problem of Many Bodies 20-119-2-13/60

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BOGOLYUBOV, Nikolay Nikolayevich

A new method in the theory of superconductivity, by N. N. Bogoliubov, V. V. Tolmachev, and D. V. Shirkov, New York, Consultants Bureau; London, Chapman & Hall, 1959.
121 P. Diagrs.
Translated from the original Russian title: Novyy metod v teorii sverkhprovodimosti. Moskva, 1958.

BHAGAVANTAM, S.; VENKATARAIDU, T.; GURKVICH, V.L. [translator]; BOGOLYUBOV, N.N., red.

[Theory of groups and its application to physical problems]
Teoriia grupp i ee primenenie k fizicheskim problemam. Pod red. N.N.Bogoliubova. Moskva, Izd-vo inostr.lit-ry, 1959. 301 p.
Translated from the English. (MIRA 13:5)
(Groups, Theory of)

OSTROGRADSKIY, Mikhail Vasil'yevich [deceased]; SHTOKALO, I.Z., akademik, otv. red.; BOGOLYUBOV, N.N., akademik, otv.red.toma; GNEDENKO, B.V., akademik, red.; ISHLINSKIY, A.Yu., akademik, red.; REMEZ, Ye.Ya., red.; SAVIN, G.N., akademik, red.; SOKOLOV, Yu.D., red.; SMIRNOV, V.I., akademik, red.; YUSHKEVICH, A.P., prof., red.; POGREBYSSKIY, I.B., dotsent, red.; SHTELIK, V.G., red.izd-va; RAKHLINA, N.P., tekhn.red.

[Collected works in three volumes] Polnoe sobranie trudov v trekh tomakh. Kiev, Izd-vo Akad.nauk USSR. Vol.1. 1959. 310 p. (MIRA 12:8)

1. AN USSR (for Shtokalo, Gnedenko, Ishlinskiy, Savin). 2. Chlen-korrespondent AN USSR (for Remez, Sokolov).
(Science)

BOGOLYUBOV, N.N.

21(0), p. 2, 7 PHASE I BOOK EXPLOITATION SOV/2081

International Conference on the Peaceful Uses of Atomic Energy, 2d., Geneva, 1958

Doklady sovetskikh uchenykh; yadernaya fizika (Reports of Soviet Scientists; Nuclear Physics) Moscow, Atomizdat, 1959. 552 p. (Series: Its: Trudy, Vol. 1) 8,000 copies printed.

Eds. (Title page): A.I. Alikhanov, Academician; V.I. Veksler, Academician; and N.A. Vlasov, Candidate of Physical and Mathematical Sciences; Ed. of this volume: S.I. Drozdov and D.F. Zaretskiy, Candidates of Physical and Mathematical Sciences; Ed. (Inside book): G.L. Smolyan; Tech. Ed.: Ye.I. Mazel'.

PURPOSE: This collection of articles is intended for scientific research workers and other persons interested in nuclear physics. The volume contains 43 papers presented by Soviet scientists at the Second Conference on Peaceful Uses of Atomic Energy, held in Geneva in September 1958.

COVERAGE: It is divided into two parts. Part I contains 17 papers dealing with plasma physics and controlled thermonuclear reactions, and Part II contains 26 papers on nuclear physics, including problems of particle acceleration and of cosmic ray physics. The first paper by L.A. Artsimovich presents a review of Soviet work on controlled thermonuclear reactions. The remaining papers in

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Part I deal with particular problems in this field. In Part II the two articles most representative of Soviet work in nuclear physics are those by V.I. Veksler and N.N. Bogolyubov. The paper by Veksler, "Startup of a 10-Bev Synchrophasotron and the First Results of Physical Research", deals with advanced work in nuclear physics using one of the most advanced and powerful tools in nuclear studies. A general description of the apparatus is given, together with a number of photographs showing different views. In his paper, "Investigations of the Many-body Problem and Their Application to the Theory of Nuclear Matter", N.N. Bogolyubov deals with the phenomena of superconductivity and superfluidity and with the development of the phenomenological and the microscopic theories. He states that he has developed a new approach to the theory of heavy nuclei, and relates that he and a number of other Soviet scientists undertook a systematic investigation of Frohlich's work on superconductivity. He claims to have fully verified Frohlich's conceptions of the state of superconductivity. He also states that his approach, based on the superfluidity concept of nuclear matter, will be effective in revising the existing statistical theory of heavy nuclei. Other papers in Part II deal in detail with various problems in nuclear physics, such as the fission of heavy atoms and their isotopes, and with the study of cosmic radiation by means of artificial earth satellites and rockets, described in a paper by S.N. Vernov. The Russian-language edition of the proceedings of

the conference is published in 16 volumes. The first 6 volumes contain all the papers presented by Soviet scientists as follows: Volume (1), Yadernoya fizika (Nuclear Physics); Volume (2), Yadernyye neaktory i yadernaya energetika (Nuclear Reactor and Nuclear Power); Volume (3), Yadernoye goryucheye metally (Nuclear Fuel and Reactor Metals), Volume (4), Khimiya radioelementov i radiatsionnykh prevrashcheniy (Chemistry of Radioelements and of Radiation Transformations); Volume 5, Radiobiologiya i radiatsionnaya meditsina (Radiobiology and Radiation Medicine); Volume (6) Polucheniye i primeneniye izotopov (Production and Use of Isotopes). The other 10 volumes contain selected papers presented at the Conference by non-Soviet scientists. In the present volume discrepancies between the English and Russian language edition of the proceedings have been noted in three articles where the texts are not identical; viz; Andrianov, et al, "High Current Pulsed Discharge"; Akhiyezer, et al, "High Frequency Plasma Oscillation"; and Bogolyubov, "Investigations of the Many-body Problem". The serial numbers of reports 2302 and 2504 are reversed in the English edition. Report 2211, by Sinelnikov, et al, is numbered 2536 in the English edition.

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APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000205920008-5"

PART I. PLASMA PHYSICS AND THE PROBLEM OF CONTROLLED THERMONUCLEAR REACTIONS

PART II. NUCLEAR PHYSICS

of Sciences, USSR);L.A. Matalin, A.M. Shimanskiy, A.A. Ivanov, V.F. Semenkov, and S.I. Chubarov of the Fizicheskiy institut Glavatoma (Physical Institute of Glavatom); I.V. Shtranikha of the Fizicheskiy institut AN SSSR (Physical Institute, Academy of Sciences, USSR); and I.A. Radkevich and V.V. Sokolovskiy of the Teplotekhnicheskaya laboratoriya AN SSSR (Heat Engineering Laboratory of the Academy of Sciences, USSR).

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AVAILABLE: Library of Congress (QC770. I53 1958)

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8-28-59

BOGOLUBOV, N.

New research in connection with the many-body problem of quantum mechanics; a summarizing lecture at the 2d Geneva Conference on Atomic Energy, Sept. 1958 p. 227

FIZIKAI SZEMLE. (Eotvos Lorand Fizikai Tarsulat) Budapest, Hungary. Vol. 9, no. 8, 1959.

Monthly list of East European Accessions, (EEAI) LC, Vol. 9, No. 1, Jan. 1960 Uncl.

24(5)

AUTHORS: Bogolyubov, N. N., Academician, Solov'yev, V. G.

SOV/20-124-5-14/62

TITLE: On a Variation Principle in the Many-body Problem (Ob odnom variatsionnom printsipe v probleme mnogikh tel)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 5, pp 1011-1014 (USSR)

ABSTRACT: N. N. Bogolyubov (Ref 1) suggested a new variation principle, which is a generalization of the known method developed by V. A. Fok (Ref 2). Investigation of this new variation principle was then continued by S. V. Tyablikov (Refs 4, 7). The present paper contains a report on further investigations of the variation principle in the many-body problem: The authors determine equations for the steadiness in explicit form and investigate the application of this variation principle to 2 special cases. They investigated a system of interacting Fermi-particles with the Hamiltonian

$$H = \sum_{f,f'} E(f',f) a^+_f a_{f'} + \frac{1}{2} \sum_{f_1,f_2,f'_1,f'_2} K(f'_2,f'_1;f_1,f_2) a^+_{f_1} a^+_{f_2} a_{f'_2} a_{f'_1}$$

Here it holds that $E(f',f) = T(f',f) - \lambda \delta_{f,f'}$; λ - the

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chemical potential, f - the totality of indices characterizing the state of this particle. For the real function it holds that $K(f_2',f_1';f_1',f_2) = K(f_2,f_1,f_1',f_2') = K(f_1',f_2';f_2,f_1)$. Next, a canonical transformation of Fermi-amplitudes is carried out and the mean value of H with respect to this state is defined. Calculation is followed step by step. In conclusion, the authors speak about the application of the new variation principle to 2 special cases of the many-body problem. There are 7 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research)

SUBMITTED: December 1, 1958

BOGOLYUBOV, N. N.

21(0)

SOV/89-6-4-16/27

AUTHOR: Parkhit'ko, V.

TITLE: The Fifth Session of the Scientific Council of the Joint Institute of Nuclear Research (Pyataya sessiya Uchenogo soveta Ob"yedinennogo instituta yadernykh issledovaniy)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 4, p 479 (USSR)

ABSTRACT: The fifth session of the Scientific Council of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) was held from January 14 to 17, 1959. Lectures were held on the following important papers, which were also discussed: Professor V. P. Dzhelepov spoke about the results obtained by the work carried out by the Laboratoriya yadernykh problem (Laboratory of Nuclear Research). Investigations were carried out of: the elastic and inelastic scattering of nucleons on polarized and non-polarized particles, scattering of π-mesons on nucleons, processes of weak interaction in the presence of μ-mesons, and the properties of μ-mesons. The Director of the Laboratoriya teoreticheskoy fiziki (Laboratory for Theoretical Physics) Academician N. N. Bogolyubov, reported that the following subjects were investigated: general scattering theory, field theory, theory

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The Fifth Session of the Scientific Council of the Joint Institute of Nuclear Research

of elementary particles, nucleon structure, dispersion relations, use of the theory of superconductivity in investigations of nuclear matter. Academician V. I. Veksler reported on the work carried out by the Laboratory for High Particle Energies. A considerable amount of work was carried out for the purpose of fixing the normal operational conditions for the 10 Bev synchrophasotron in order to be able, above all, to work day and night with this device. Moreover, a number of new physical devices was developed. The Scientific Council praised the work performed by this laboratory. The results obtained by the most important work carried out by these 3 laboratories were outlined at the 2. Geneva Atomic Conference. I. M. Frank, Corresponding Member, AS USSR and Holder of the Nobel Prize, spoke about the progress made in building the impulse reactor at the Laboratoriya neytronnoy fiziki (Neutron-Physics Laboratory). This reactor differs essentially from a normal reactor and is especially well suited for work to be carried out in the field of neutron physics.

 G. N. Flerov, Corresponding Member, AS USSR, gave a report

The Fifth Session of the Scientific Council of the Joint Institute of Nuclear Research

about nuclear reactions with highly ionized particles. Work was carried out jointly by the USSR and the participating countries in the Laboratory of Nuclear Physics. The Scientific Council approved and confirmed the scientific building plans for 1959. The management of the Institute submitted a plan for the improvement of collaboration among the participants. The Scientific Council expressed its gratitude especially to the following persons: D. I. Blokhintsev, Director of the Institute, Corresponding Member, AS USSR; Václav Votruba, Deputy Director and Corresponding Member of the Czechoslovakian Academy of Sciences, and Professor Marian Danysz (Poland), Deputy Director.

S/155/59/000/02/035/036

AUTHORS: Bogolyubov, N.N., Vladimirov, V.S.

TITLE: Supplement to the Paper "A Theorem on the Analytic Continuation of Generalized Functions"

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1959, No. 2, p.179

TEXT: In (Ref. 1) it was shown that, if the Fourier transforms $\tilde{F}_r(p)$ and $\tilde{F}_a(p)$ of certain generalized functions $F_r(x)$ and $F_a(x)$ coincide in the domain

(1) $p_0^2 - p_1^2 - \cdots - p_n^2 < m \quad (m \gtrless 0)$,

then in (1) there holds the representation $\tilde{F}_r(p) = \tilde{F}_a(p) =$

$= \sum P_k(p) \phi_k(p_0^2 - p_1^2 - \cdots - p_n^2)$, where the $\phi_k(\zeta)$ are continuable into the whole ζ - plane except the intersection

(3) $\quad \mathrm{Im}\ \zeta = 0 \ , \quad \mathrm{Re}\ \zeta \geq m$.

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Supplement to the Paper "A Theorem on the Analytic Continuation of Generalized Functions" S/155/59/000/02/035/036

Now it is stated that (3) must be replaced by

(4) $\operatorname{Im} \zeta = 0$, $\operatorname{Re} \zeta \geqslant 0$,

if $m<0$.

There is 1 Soviet reference.

ASSOCIATION: Matematicheskiy institut imeni V.A. Steklova AN SSSR
(Mathematical Institute imeni V.A. Steklov AS USSR)

SUBMITTED: April 15, 1959

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2.(5)

SOV/56-37-3-33/62

AUTHORS: Bogolyubov, N. N., Logunov, A. A., Shirkov, D. V.

TITLE: The Method of Dispersion Relations and the Perturbation Theory

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 805-815 (USSR)

ABSTRACT: The present paper is in close relationship to a paper by Redmond (Ref 1), in which expressions are derived for the Green function, which correspond to the perturbation theory and, at the same time, contain no known logarithmic singularities. In the introduction Redmond's method is described, and on the basis of the example of the Green boson- and meson functions the setting up of these expressions and the elimination of non-physical poles is discussed. The method employed by the authors is discussed on the basis of the elimination of "logarithmic" poles from the Green photon function. In contrast to Redmond's method, which is based upon the interrelation of the spectral representations for the Green function and for the polarization operator, the authors proceed from the principle of summating the information deduced from the perturbation theory under the sign of the Källèn-Lehmann spectral integral.

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If the contributions from the "main logarithmic diagrams" are summated in this manner, expressions are obtained for the photon propagation function in quantum electrodynamics and for the meson propagation function in the theory of charge symmetry; these expressions have all essential properties of Redmond's result: Regular analytical behavior in the complex plane of the momentum variable p^2, and a singularity with respect to the variable e^2 (square of the charge) at the point $e^2 = 0$. Whereas, however, Redmond's result yields only the lowest order in the perturbation theory, the expressions of the present paper correspond to expansion terms in perturbation theory in the range of large p^2 of arbitrary order. Consideration of the lowest logarithmic terms shows that the range of applicability of the new formulas is the same as in the older formulas which have logarithmic singularities. For the occurrence of a logarithmic pole the following causes are determined: Either the initial Lagrangian is not physical, i.e. its function system does not satisfy the demands of the spectrum, or the approximation meth-

The Method of Dispersion Relations and the Perturbation Theory

od is not advantageously chosen. The reduction of the expressions found to a renormalization-invariant form is demonstrated in part 4 of this paper on the basis of the example of Green's photon function, and in part 5 a possibility of applying the summation method within the framework of non-renormalizable theories is discussed (on the basis of the example of the nonlinear fermion theory). The results obtained by this paper are summarized, and the authors thank Professor D. I. Blokhintsev, B. V. Medvedev, and M. K. Polivanov for discussions. There are 13 references, 5 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: April 17, 1959

24(5)
AUTHOR: Bogolyubov, N.N. SOV/53-67-4-1/7

TITLE: On the Compensation Principle and the Method of the Self-consistent Field (O printsipe kompensatsii i metode samosoglasovannogo polya)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 4, pp 549-580 (USSR)

ABSTRACT: In the present very detailed theoretical paper the author investigates the possibility of a generalization of the compensation principle of the dangerous diagrams for the case of a spatially homogeneous state and its connection with the method of the self-consistent field. The rather difficult paper is based partly upon the results obtained by previous papers and is subdivided into 5 parts. Part 1 investigates the compensation principle for the case of a vector potential $\vec{A}(\vec{r})$ that is dependent on r and of general canonical transformation $a_f = \sum_{(\nu)} (u_{f\nu}\alpha_\nu + v_{f\nu}\alpha_\nu^+)$; the compensation principle of the dangerous diagram is here in first approximation: $\langle \alpha_{\nu_1}\alpha_{\nu_2}H\rangle = 0$. In part 2 the method

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of the self-consistent field is generalized for the case of time-dependent processes (it has hitherto been used only for the determination of a not time-dependent ground state). In part 3 the author investigates the representation with a fixed particle number, and in part 4 the problem of the determination of the spectrum of elementary excitations of the ground state is investigated by using the method of the self-consistent field; a representation of collective oscillations is given. Part 5 finally, by way of an example for the application of the theory, mentions the problem of the variation of a supraconductive ground state under the action of an external constant field $\vec{A}(r)$ in linear approximation, where $\vec{A}(r)$ may be considered to be infinitely small in first approximation; the electrodynamic equations describing such a variation are written down and their statements are mathematically investigated. There are 11 references, 5 of which are Soviet.

SUBMITTED: March 2, 1959

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24(5)

AUTHORS: Bogolyubov, N. N., Academician, Tyablikov, S. V. SOV/20-126-1-13/62

TITLE: Green's Retarded and Advance Functions in Statistical Physics (Zapazdyvayushchiye i operezhayushchiye funktsii Grina v statisticheskoy fizike)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 1, pp 53-56 (USSR)

ABSTRACT: The present paper reports on a method of approximation of solving problems in statistical physics. The method is based on the investigation of two-dimensional retardation and advance Green functions. The essential factor is the use of spectral representations of the Lehmann-Källén type (Refs 2, 3). Some previous papers on this subject are pointed out. The authors use Green functions of the type:
$G_r(t-t') = \langle\langle A(t), B(t')\rangle\rangle_r = \theta(t-t')\langle[A(t); B(t')]\rangle$;
$G_a(t-t') = \langle\langle A(t), B(t')\rangle\rangle_a = -\theta(t'-t)\langle[A(t); B(t')]\rangle$, in which
$\langle U\rangle = Q^{-1}Sp(Ue^{-H/\vartheta})$ and $Q = Sp(e^{-H/\vartheta})$. The ascertainment of the mean value is carried out by means of a large number of equations so that H includes the term $-\lambda N$. λ denotes the chemical potential, and N the number of particles. A(t), B(t) denote the operators in the Heisenberg representation, they are products of the quantized field

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functions. It is not difficult to obtain branched chains of equations for these Green functions. The resulting chain of equations is not only equal for the retardation and advance Green functions, but it also remains equal for Green functions of the Schwinger type: $G(t - t') = \langle T(A(t)B(t')) \rangle$ with T-products. In spite of this, the retardation and advance functions have the essential advantage over Schwinger's functions that they can be continued into the complex plane. In fact, the authors investigate the Fourier expressions $G_j(t-t') = \int_{-\infty}^{\infty} S_j(E) e^{-iE(t-t')} dE$, $S_j(E) = \frac{1}{2\pi} \int_{-\infty}^{\infty} G_j(t) e^{iEt} dt$ $(j = a, r)$. As at $t < 0$, $G_r(t) = 0$, and at $t > 0$, $G_a(t) = 0$, it results that, under the usual assumptions, $S_r(E)$ can be continued into the upper half-plane, and $S_a(E)$ into the lower one. They are regular analytical functions in these half-planes (outside the real axis). The authors then formulate the following method: A chain of equations is set up for Green functions used. This infinite chain of interlaced equations is then "released" by means of any approximation, and transformed into a finite system. Such an approximation must be chosen quite individually because of the character of the problem, and the

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authors have not yet been able to suggest a problem generally applicable. In particular, the products $\langle B(t')A(t)\rangle = \int_{-\infty}^{\infty} I(w)e^{-iw(t-t')}dw$ are interesting for the physical investigation, for they are functions of correlation. Also the Green functions discussed here are not suitable for a direct use at $t' = t$. Subsequently, the general expressions are illustrated by some examples, namely on Heisenberg's model of ferromagnetism, and on the usual Hamiltonian by Fröhlich. There are 9 references, 5 of which are Soviet.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute imeni V. A. Steklov of the Academy of Sciences, USSR)

SUBMITTED: February 19, 1959

[redacted]

BOGOLYUBOV, N. N. Chief of Dept., Inst. of Mathematics im Steklov, AS USSR

"The Basis of Stable Peace."

paper presented at the Pugwash Conference on Disarmament and World Security, Moscow, 27 Nov-6 Dec. 60.

BOGOLYUBOV, N. N.

"Some Problems in Theory of Super Conductivity."

report presented at the Intl. Conference on Many-Body Problems, Utrecht, 13-18 June 1960.

KARLEMAN, Torsteyn, matematik[Carleman, T.]; KARABEGOV, V.-K.I. [translator]; BOGOLYUVOV, N.N., red.; AGRANOVICH, M.S., red.; PRIDANTSEVA, S.V., tekhn. red.

[Mathematical problems in the kinetic theory of gases. Translated from the French] Matematicheskie zadachi kineticheskoi teorii gazov. Pod red. N.N.Bogoliubova. Moskva, Izd-vo lit-ry, 1960. 120 p.
(Gases, Kinetic theory of) (MIRA 14:7)

BOGOLYUBOV, N.N., akademik, red.; POPOV, R.Yu., red.; ZOTOVA, N.V., tekhn.red.

[Theory of superconductivity; collection of articles] Teoriia sverkhprovodimosti; sbornik statei. Pod red. N.N.Bogoliubova. Moskva, 1960. 416 p. Translated from the English and German. (MIRA 14:1)

(Superconductivity)

PHASE I BOOK EXPLOITATION SOV/[illegible]

Issledovaniya po sovremennym problemam teorii funktsiy kompleksnogo peremennogo; sbornik statey (Investigation of Modern Problems in the Theory of Complex Variables; Collection of Articles) Moscow, Fizmatgiz, 1960. [illegible] p. 5,000 copies printed.

Ed. (Title page): A. I. Markushevich; Ed. (Inside book): V. M. [illegible] and A. Ya. Khavinson; Tech. Ed.: N. Ya. [illegible].

PURPOSE: This book is intended for specialists in the theory of functions of a complex variable. It may also be used by advanced [illegible], scientific workers, and specialists in other fields of [illegible].

COVERAGE: The book contains 48 papers originally read at the [illegible] Conference on the Theory of Functions of a Complex Variable held at [illegible] University from May 28 to June [illegible] 1957. The articles [illegible] in the modern theory of functions and its applications. The book is [illegible] into 7 parts. The first part discusses the problem of [illegible], [illegible] series, boundary and extremal properties. The second part [illegible] functions and interpolation and approximation problems. The third part discusses functions of many complex variables. The fourth part discusses conformal mappings and boundary-value problems. The fifth [illegible] and the theory of distribution of values. The sixth part [illegible], and the seventh part discusses [illegible]

AVAILABLE: Library of Congress

Card 9/9 AC/dmr/fal 7-18-60

Bogolyubov, N.N.

BOGOLYUBOV, N.N., akad.; MITROPOL'SKIY, Yu.A.

Nikolai Mitrofanovich Krylov; on his 80th birthday. Ukr. mat. zhur. 12 no.2:205-208 '60. (MIRA 13:10)

1. Chlen-korrespondent AN USSR (for Mitropol'skiy).
(Krylov, Nikolai Mitrofanovich, 1879-)

Bogolyubov, N.N.

S/056/60/039/01/18/029
B006/B063

AUTHORS: Bogolyubov, N. N., Zubarev, D. N., Tserkovnikov, Yu. A.

TITLE: An Asymptotically Exact Solution of the Model Hamiltonian of the Theory of Superconductivity

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 1(7), pp. 120-129

TEXT: Using the model Hamiltonian by Bardeen, Cooper, and Schrieffer the authors have shown in a preceding paper (Ref. 1) that the thermodynamic functions of a superconducting system of the volume V are asymptotically exact if $V \to \infty$ and $N/V = \text{const}$ (N - number of particles). This was explained by the fact that each term of the perturbation-theoretical expansion, by means of which the correction to the solution was calculated, becomes asymptotically small when $V \to \infty$. The present paper shows that an asymptotically exact solution as the one given in Refs. 1 and 2 is obtained even if perturbation theory is not employed. It is further shown that the solution resulting for $V \to \infty$, which corresponds to the non-superconductive state (trivial solution), is not applicable at temperatures, Θ, below

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that of the phase transition, Θ_0, as it does not satisfy the conditions required for exact Green functions. It has already been said (Refs. 4 and 5) that there is no trivial solution for $\Theta < \Theta_0$. The authors first give and discuss the model and approximative Hamiltonians of the theory of superconductivity. The second part of the present paper shows that the whole chain of equations constructed for Green functions on the basis of the model Hamiltonian can be satisfied asymptotically. The last part shows that the trivial solution cannot be used below the critical temperature as it does not satisfy the conditions required for exact Green functions. A summary of the results of this work is given in conclusion. L. N. Gor'kov is also mentioned. There are 11 references: 7 Soviet and 2 US.

/B

ASSOCIATION: Matematicheskiy institut Akademii nauk SSSR (Institute of Mathematics of the Academy of Sciences, USSR)

SUBMITTED: February 13, 1960

PHASE I BOOK EXPLOITATION SOV/5959 BR

Bogolyubov, N. N.

Kvazisredniye v zadachakh statisticheskoy mekhaniki (Quasi-Averages in Problems of Statistical Mechanics) [Dubna, 1961] 123 p. 520 copies printed.

Sponsoring Agency: Ob"yedinennyy institut yadernykh issledovaniy. Laboratoriya teoreticheskoy fiziki.

Contributors not mentioned.

PURPOSE: This book is intended for theoretical and nuclear physicists.

COVERAGE: The book deals with the application of quasi-average values to problems of statistical mechanics. The derivation of Green's function from average values and its application in the perturbation theory are described. No personalities are mentioned. There are 11 references: 9 Soviet and 2 English.

Card 1/0

BOGOLYUBOV, N.N.; MITROPOL'SKIY, Yu.A.

[Method of integral manifolds in nonlinear mechanics] Metod integral'nykh mnogoobrazii v nelineinoi mekhanike. Kiev, In-t matematiki AN USSR, 1961. 126 p. (MIRA 18:7)

OSTROGRADSKIY, Mikhail Vasil'yevich, matematik, mekhanik; SHTOKALO, I.Z., akademik,otv. red.; GNEDENKO, B.V., akademik, zam. otv. red.; ISHLINSKIY, A.Yu., akademik, zam. otv. red.; BOGOLYUBOV, N.N., akademik, red.; REMEZ, Ye.Ya., red.; SAVIN, G.N., akademik, red.; SOKOLOV, Yu.D., red.; SMIRNOV, V.I., akademik, red.; YUSHKEVICH, A.P., prof., red.; POGREBYSSKIY, I.B., dotsent, red.; SHTELIK, V.G., red. izd-va; RAKHLINA, N.P., tekhn. red.

[Complete works in three volumes] Polnoe sobranie trudov v trekh tomakh. Kiev, Izd-vo Akad. nauk USSR. Vol.2. 1961. 358 p. (MIRA 14:11)

1. AN USSR (for Shtokalo, Gnedenko, Ishlinskiy). 2. Chlen-korrespondent AN USSR (for Remez, Sokolov).
(Mechanics, Analytic)

BOGOLYUBOV, N.N., red.; GNEDENKO, B.V., red.; POGREBYSSKIY, I.B., red.; REMEZ, Ye.Ya., red.; SMIRNOV, V.I., red.; SOKOLOV, Yu.D., red.; SHTOKALO, I.Z., red.; YUSHKEVICH, A.P., red.; SHIROKOVA, S.A., red.; YERMAKOVA, Ye.A., tekhn. red.

[Pedagogical heritage and documents on the life and work of Mikhail Vasil'evich Ostrogradskii (1.1.1862 - 1.1.1962)] Mikhail Vasil'evich Ostrogradskii, 1 ianvaria 1862 - 1 ianvaria 1962; pedagogicheskoe nasledie, dokumenty o zhizni i deiatel'nosti. Pod red.I.B.Pogrebysskogo i A.P.IUshkevicha. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1961. 397 p. (MIRA 15:1)

1. Akademiya nauk SSSR. Institut matematiki.
(Ostrogradskii, Mikhail Vasil'evich, 1801-1861)

KRYLOV, Nikolay Mitrofanovich, akademik, matematik [deceased]; MITROPOL'SKIY, Yu.A., prof., otv. red.; BOGOLYUBOV, N.N., akademik, glav. red.; BLAGOVESHCHENSKIY, Yu.V., kand. tekhn. nauk, red.; LYKOVA,O.B., red.izd-va; SKLYAROVA, V.Ye., tekhn. red.

[Selected works in three volumes] Izbrannye trudy v trekh tomakh. Kiev, Izd-vo Akad. nauk USSR. Vols.1-3. 1961. (MIRA 14:10)

1. Chlen-korrespondent AN USSR (for Mitropol'skiy).
(Mathematics)

OSTROGRADSKIY, Mikhail Vasil'yevich [deceased]; SHTOKALO, I.Z., akademik, otv.red.; GNEDENKO, B.V., akademik, otv.red.toma; ISHLINSKIY, A.Yu., akademik, zamestitel' otv.red.; BOGOLYUBOV, N.N., akademik, red.; REMEZ, Ye.Ya., otv.red.toma; SAVIN, G.N., akademik, red.; SOKOLOV, Yu.D., red.; SMIRNOV, V.I., akademik, red.; YUSHKEVICH, A.P., prof., red.; POGREBYSSKIY, I.B., dotsent, red.; SHTEYLIK, V.G., red.izd-va; RAKHLINA, N.P., tekhn.red.

[Complete collection of works in three volumes] Polnoe sobranie trudov v trekh tomakh. Kiev, Izd-vo Akad.nauk USSR. Vol.3. 1961. 395 p. (MIRA 15:2)

1. AN USSR (for Shtokalo, Gnedenko, Savin). 2. Chleny-korrespondenty AN USSR (for Remez, Sokolov).
(Mathematics)
(Ostrogradskii, Mikhail Vasil'evich, 1801-1861)

BOGOLYUBOV, N. N. and MITROPOLSKIY, YU. A.

"The method of integral manifolds in monlinear mechanics."

Paper presented at the Intl. Symposium on Nonlinear Vibrations, Kiev, USSR, 9-19 Sep 61

Institute of Mathematics, Kiev, USSR

BOGOLYUBOV, N. N. and SADOVNIKOV, B. I.

"On periodic solutions of differential equations of the n-order with a small parameter."

Paper presented at the Intl. Symposium on Nonlinear Vibrations, Kiev, USSR, 9-19 Sep 61

Moscow State University, Moscow

27668
S/041/61/013/003/001/010
B112/B125

N.4500

AUTHORS: Bogolyubov, N. N. (the younger), and Sadovnikov, B. I.

TITLE: Periodic solutions of an n-th order differential equation with a small parameter

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 13, no. 3, 1961, 3-11

TEXT: Using the method of successive approximations the authors construct periodic (period 2π) solutions $y(t)$ of the integro-differential equation: $y^{(n)} = \mu(f - \langle f \rangle)$, $\langle f \rangle = \frac{1}{2\pi}\int_0^{2\pi} f(t)dt$. They study both convergence of the approximation and stability of the solution. The function $f = f(t, x, x', \ldots, x^{(n-1)}, \mu)$ is periodic (period 2π) with respect to t and assumed to be analytic with respect to the complex variables $x, x', \ldots, x^{(n-1)}$. μ is a small parameter. The $(m + 1)$-th approximation is obtained as periodic solution of the equation:

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Periodic solutions of an n-th ...

$$y_{m+1}^{(n)} = \mu\left\{f(t; \xi + y_m, y_m', \ldots, y_m^{(n-1)}; \mu) - \langle f(t; \xi + y_m, y_m', \ldots, y_m^{(n-1)}; \mu)\rangle\right\}$$

with the additional condition: $\langle y_{m+1}\rangle = 0$. To determine the parameter ξ the equation

$$\Phi(\xi,\mu) = \langle f(t; \xi + y, y', \ldots, y^{(n-1)}; \mu)\rangle = 0$$

must be solved. To study the stability of the solutions $x = \xi(\mu) + y(t, \xi(\mu), \mu)$ the author reduces the equation of variations

$$\delta x^{n} = \mu \sum_{q=0}^{n-1} \frac{\partial f(t, \xi + y(t, \xi, \mu), y'(t, \xi, \mu), \ldots, y^{(n-1)}(t, \xi, \mu); \mu)}{\partial x^{(q)}} \delta x^{(q)}.$$

to an equation with constant coefficients. This reduction is made according to K. A. Breys (DAN SSSR, t. 108, No. 6, 997-1000). There are 3 Soviet and 1 non-Soviet references.

SUBMITTED: April 10, 1961, Moscow

Card 2/2

BOGOLYUBOV, N.N.; SADOVNIKOV, B.I.

One variant of the averaging method. Vest. Mosk. un. Ser. 3: Fiz., astron. 16 no.3:24-34 My-Je '61. (MIRA 14:7)

1. Kafedra statisticheskoy fiziki i mekhaniki Moskovskogo gosudarstvennogo universiteta.
(Approximate computation) (Differential equations, Partial)

BOGOLYUBOV, N.N.

PHASE I BOOK EXPLOITATION SOV/6201

Vsesoyuznyy s"yezd po teoreticheskoy i prikladnoy mekhanike. 1st, Moscow, 1960.

Trudy Vsesoyuznogo s"yezda po teoreticheskoy i prikladnoy mekhanike, 27 yanvarya -- 3 fevralya 1960 g. Obzornyye doklady (Transactions of the All-Union Congress on Theoretical and Applied Mechanics, 27 January to 3 February 1960. Summary Reports). Moscow, Izd-vo AN SSSR, 1962. 467 p. 3000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Natsional'nyy komitet SSSR po teoreticheskoy i prikladnoy mekhanike.

Editorial Board: L. I. Sedov, Chairman; V. V. Sokolovskiy, Deputy Chairman; G. S. Shapiro, Scientific Secretary; G. Yu. Dzhanelidze, S. V. Kalinin, L. G. Loytsyanskiy, A. I. Lur'ye, G. K. Mikhaylov, G. I. Petrov, and V. V. Rumyantsev; Resp. Ed.: L. I. Sedov; Ed. of Publishing House: A. G. Chakhirev; Tech. Ed.: R. A. Zamarayeva.

Card 1/ 6 2

PURPOSE: This book is intended for scientific and engineering personnel who are interested in recent work in theoretical and applied mechanics.

COVERAGE: The articles included in these transactions are arranged by general subject matter under the following heads: general and applied mechanics (5 papers), fluid mechanics (10 papers), and the mechanics of rigid bodies (8 papers). Besides the organizational personnel of the congress, no personalities are mentioned. Six of the papers in the present collection have no references; the remaining 17 contain approximately 1400 references in Russian, Ukrainian, English, German, Czechoslovak, Rumanian, French, Italian, and Dutch.

TABLE OF CONTENTS:

SECTION I. GENERAL AND APPLIED MECHANICS

S/188/62/000/005/006/008
B102/B108

AUTHORS: Bogolyubov, N. N. (junior), Sadovnikov, B. I.

TITLE: Green's functions in the statistical mechanics of classical systems and their spectral representations

PERIODICAL: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 5, 1962, 54 - 61

TEXT: As spectral representation of the Green functions plays so important a part in the statistics of quantum mechanics the authors introduce the advanced and retarded two-time Green functions into the statistics of classical mechanics and derive a spectral representation of these functions. The Green functions are introduced in a way similar to that in quantum mechanics and the transition to classical mechanics is made by the limiting process, $\hbar \to 0$. This limiting process is impossible for the "causal" Green functions that occur in quantum mechanics since in the classical case they take the form $G_c = \langle T \ldots\ldots \rangle / i\hbar$. Hence it is only the retarded and advanced functions

$$G_r(t, t') = \theta(t - t') \langle [A(t); B(t')] \rangle, \qquad (1)$$

$$G_a(t, t') = -\theta(t' - t) \langle [A(t); B(t')] \rangle.$$

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Green's functions in the...

are brought into classical mechanics. [A;B] is the Poisson bracket; $\Theta(t) = \begin{cases} 1, t > 0 \\ 0, t < 0 \end{cases}$. The spectral representation is arrived at by a way analogous to that in quantum mechanics, via a Fourier representation and a limiting process $h \to 0$

$$\langle [A(t);\ B(t')] \rangle = -\frac{i}{\hbar} \int_{-\infty}^{+\infty} I(\omega)\, \omega e^{-i\omega(t-t')} d\omega,$$

$$\ll A, B \gg_E^{\text{ret}} = \frac{1}{2\pi\hbar} \int_{-\infty}^{+\infty} I(\omega)\, \omega \frac{d\omega}{E + i\varepsilon - \omega}, \qquad (9)$$

$$\ll A, B \gg_E^{adv} = \frac{1}{2\pi\hbar} \int_{-\infty}^{+\infty} I(\omega)\, \omega \frac{d\omega}{E - i\varepsilon - \omega}.$$

The validity of these relations is proved in what follows. Further, a classical analogue is derived for the quantum mechanical theorem on the

Green's functions in the...

variation of the mean value of a dynamic quantity under the action of an infinitely small adiabatic increment of the Hamiltonian. This infinitely small increment is expressed by

$$H \to H + \delta H(t),$$
$$\delta H = \sum_{\Omega} e^{-iEt} \delta U_{\Omega}(q_1 \dots q_N;\ p_1 \dots p_N), \qquad (11)$$
$$(E = i\varepsilon + \Omega;\ \varepsilon > 0).$$

The increment $\delta\langle A(t)\rangle$ due to the variation of the Hamiltonian is calculated using the dynamic variable A as expressed by

$$A(t) = A(q_1(t), \dots, q_N(t);\ p_1(t), \dots, p_N(t))$$

The results can be represented in the simple form

Card 3/4

$$\delta \langle A(t) \rangle = 2\pi \sum_{\Omega} e^{-iEt} \ll A, \delta U_{\Omega} \gg_{\Omega},$$

$E = \Omega + \varepsilon i$, ret.

$E = \Omega - \varepsilon i$, adv

ASSOCIATION: Kafedra statisticheskoy fiziki i mekhaniki (Department of Statistical Physics and Mechanics)

SUBMITTED: January 19, 1962

S/056/62/043/002/043/053
B108/B102

24.4500

AUTHORS: Bogolyubov, N. N., (jr.), Sadovnikov, B. I.

TITLE: Green's functions and distribution functions in statistical mechanics of classical systems

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 677-688

TEXT: Two-time advanced and retarded Green's functions and their spectral representation are introduced in the statistical mechanics of classical systems. A method is developed of deriving a chain of equations for determining these two-time "classical" Green's functions. This method consists in varying a known system of equations for the general one-time distribution functions with respect to an infinitely weak external field. The method is illustrated by an example of a self-consistent field type approximation. The resultant equation for the Green's functions is solved in quadratures.

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ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

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PHASE I BOOK EXPLOITATION SOV/6574

Bogolyubov, Nikolay Nikolayevich, and Yuriy Alekseyevich Mitropol'skiy

Asimptoticheskiye metody v teorii nelineynykh kolebaniy (Asymptotic Methods in the Theory of Nonlinear Vibrations) 3d ed., rev. and enl. Moscow, Fizmatgiz, 1963. 410 p. 5000 copies printed.

Ed.: Ye. Ye. Zhabotinskiy; Tech. Ed.: L. V. Likhacheva.

PURPOSE: The book is intended for engineers and scientific workers interested in oscillatory processes.

COVERAGE: The book is revised and extended edition of a well-known book first published in 1955. It deals with approximate asymptotic methods for solving problems in the theory of nonlinear oscillations which arise in physics and engineering. The methods are discussed in a very simple form; special mathematical training is not required for their understanding. This edition is supplemented with results concerning relaxational oscillation obtained

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2

by L. S. Pontryagin and Ye. F. Mishchenko and with results concerning the generalized averaging method obtained by V. M. Volosova. There are 49 references, mostly Soviet.

TABLE OF CONTENTS:

AMBARTSUMYAN, V.A., akademik; ASRATYAN, E.A.; BOGOLYUBOV, N.N., akademik; VINOGRADOV, A.P., akademik; GINETSINSKIY, A.G.; KNUNYANTS, I.L., akademik; KOCHETKOV, N.K.; KURSANOV, A.L., akademik; MEL'NIKOV, O.A.; NESMEYANOV, A.N., akademik; NESMEYANOV, An.N., doktor khim. nauk; OBREIMOV, I.V., akademik; POLIVANOV, M.K., kand.fiz.-mat.nauk; REUTOV,O.A.; RYZHKOV, V.L.; SPITSIN, V.I., akademik; TAMM, I.Ye., akademik; FESENKOV, V.G., akademik; FOK, V.A., akademik; SHCHERBAKOV, D.I., akademik; FRANK, I.M.; FRANK, G.M.; KHOKHLOV, A.S., doktor khim. nauk; SHEMYAKIN, M.M., akademik; ENGEL'GARDT, V.A., akademik; SHAPOSHNIKOV, V.N., akademik; BOYARSKIY,V.A.; LIKHTENSHTEYN, Ye.S.; VYAZEMT'SEVA, V.N., red.izd-va; KLYAYS, Ye.M., red.izd-va; TARASENKO, V.M., red.izd-va; POLYAKOVA, T.V., tekhn. red.

[As seen by a scientis: From the Earth to galaxies, To the atomic nucleus, From the atom to the molecule, From the molecule to the organism] Glazami uchenogo: Ot Zemli do galaktik, K iadru atoma domolekuly, Ot molekuly do organizma. Moskva, Izd-vo AN SSSR, 1963. 736 p. (MIRA 16:12)

1. Akademiya nauk SSSR. 2. Chlen-korrespondent AN SSSR (for Asratyan, Ginetsinskiy, Kochetkov, Mel'nikov, Reutov, Ryzhkov, Frank,I.M., Frank, G.M.)
(Astronomy) (Nuclear physics) (Chemistry) (Biology)

S/188/63/000/001/012/014
B164/B102

AUTHORS: Bogolyubov, N. N. (jr.), Sadovnikov, B. I.

TITLE: Green's functions and distribution functions in statistical mechanics of quantum systems

PERIODICAL: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 1, 1963 74-80

TEXT: The method developed by the authors for the statistical mechanics of classical systems (ZhETF 43, no. 8, 677, 1962) is extended here to quantum mechanical systems and the relationship between the equations of the ordinary single-time distribution functions and those for two-time Green's functions are derived. It is shown that a system of coupled equations can be obtained for two-time Green's functions by varying a system of equations for distribution functions in accordance with the theorem of the variation of the mean values of dynamic operators. Approximation methods for decoupling the system of equations are briefly discussed. In a paper about to be published the authors analyze the decoupling of the system of equations for two-time Green's functions in

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first approximation. They obtain Hartree-Fock equations by the method of the Green's functions.

ASSOCIATION: Kafedra statisticheskoy fiziki i mekhaniki (Department of Statistical Physics and Mechanics)

SUBMITTED: June 2, 1962

BOGOLYUBOV, N.N.

BOGOLJUBOV, N.N. [Bogolyubov,N.N.] (Szovjetunio)

A new method in the theory of supraconduction. Magy fiz folyoir 11 no.1:73-81 '63.

BOGOLYUBOV, N.N.

Lenin Prize winner B.M.Pontecorvo. Atom. energ. 14 no.5:441-442 My '63. (MIRA 16:6)
(Pontecorvo, Bruno, 1913-)

BOGOLYUBOV, N.N. (mladshiy); SADOVNIKOV, B.I.

Hartree-Fock's equations in the method of Green's functions.
Vest. Mosk. un. Ser. 3: Fiz., astron. 18 no.2:47-57 Mr-Ap '63.
(MIRA 16:6)

1. Kafedra statisticheskoy fiziki i mekhaniki Moskovskogo universiteta.

(Potential, Theory of)
(Quantum statistics)

BOGOLYUBOV, N. N.

"Field Theoretical Methods in Physics."

report submitted for Intl Conf on Natural Philosophy Today, Pisa, Italy, 17-21 Sep 64.

BOGOLYUBOV, N. N.; MITROPOLSKIY, Yu. A.

"Regimes quasi-periodiques dans les systemes oscillants non lineaires."

report submitted for Intl Symp on Forced Vibrations in Nonlinear Systems, Marseilles, 7-12 Sep 64.

Moscow - Kiev.

SHTOKALO, I.Z., akademik, red.; BOGOLYUBOV, N.N., akademik, red.; GLUSHKOV, V.M., akademik, red.; AKHIYEZER, A.I., akademik, red.; PARASYUK, O.S., akademik, red.; KOPNIN, P.V., doktor filosofskikh nauk, red.; VIL'NITSKIY, M.B., kand. fil. nauk, red.; DYSHLEVYY, P.S., kand. fil. nauk, red.; KUCHER, V.I., red.

[Philosophical questions of modern physics; materials] Filosofskie voprosy sovremennoi fiziki; materialy. Kiev, Naukova dumka, 1964. 325 p. (MIRA 17:10)

1. Respublikanskoye soveshchaniye po filosofskim voprosam fiziki elementarnykh chastits i poley. Kiev, 1962. 2. Vitse-prezident AN Ukr.SSR (for Glushkov). 3. Ukrainskiy fiziko-tekhnicheskiy institut (for Akhiyezer). 4. Institut matematiki AN Ukr.SSR (for Parasyuk). 5. Institut filosofii AN Ukr.SSR (for Dyshlevyy, Kopnin).

L 21087-65 EWT(1) IJP(c)/AEDC(a)/AFWL/ASD(f)-3
ACCESSION NR: AP5001984 S/0020/64/159/006/1264/1267

AUTHORS: Tserkovnikov, Yu. A.; Bogolyubov, N. N. (Academician)

TITLE: Second sound in a weakly-ideal Bose gas

SOURCE: AN SSSR. Doklady, v. 159, no. 6, 1964, 1264-1267

TOPIC TAGS: Bose gas, ideal gas, second sound, Green function, elementary particle collision, plasma theory

ABSTRACT: The problem considered here is the same as treated by N. N. Bogolyubov (preprint, Joint Institute of Nuclear Research, P-1395, 1963), who obtained in the hydrodynamic approximation (oscillation frequency of the system much lower than the collision frequency between the particles) expressions for single-particle Green's functions which have poles corresponding to two types of elementary excitations: usual sound and second sound. In the present article the author considers the other limiting case of the problem, when

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ACCESSION NR: AP5001984

3

the collision frequency is low. The interaction is assumed small and the gas density is large. In this case the system of equations for the single-particle Green's function becomes equivalent to the random-phase approximation and can be easily evaluated. The asymptotic behavior of the Green's function as the time increases without limit is obtained, making the results applicable to plasma calculations. "The author thanks N. N. Bogolyubov, S. V. Tyablikov, and D. N. Zubarev for valuable discussions." This report was presented by N. N. Bogolyubov. Orig. art. has: 18 formulas.

ASSOCIATION: Matematicheskiy Institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute, Academy of Sciences, SSSR)

SUBMITTED: 29Jun64 ENCL: 00

SUB CODE: NP, GP NR REF SOV: 005 OTHER: 000

Card 2/2

BOGOLYUBOV, N.N. (mladshiy) (Moskva)

Calculating the free energy for model systems. Ukr. mat. zhur. 17 no.3:3-15 '65. (MIRA 18:6)

BOGOLYUBOV, N.N.

Mathematical problems in quantum field theory. Usp. mat. nauk 20 no.3:31-40 My-Je '65. (MIRA 18:6)

L 41710-66 EWT(d)/EWT(l)/T IJP(c)

ACC NR: AP6019525 SOURCE CODE: UR/0020/66/168/004/0766/0769

AUTHOR: Bogolyubov, N. N. 53 B

ORG: Mathematical Institute im. V. A. Steklov, Academy of Sciences SSSR (Matematicheskiy institut Akademii nauk SSSR)

TITLE: Green's functions for model Hamiltonians

SOURCE: AN SSSR. Doklady, v. 168, no. 4, 1966, 766-769

TOPIC TAGS: Green function, Hamiltonian, free energy

ABSTRACT: This is a continuation of earlier work (Vestn. Mosk. univ. no. 1, 1966; Ukr. matem. zhurn. no. 3, 1965) where it was established that for model Hamiltonians of the Bardin type, the free energy of the system per unit volume can be calculated by introducing approximating Hamiltonians that are quadratic forms of Fermi amplitudes. In the present paper it is shown that the Green's functions of the model Hamiltonian and the corresponding approximating Hamiltonian are close to each other. The derivation differes from that in another paper (Preprint, Dubna, 1960) in that it is applicable for other than zero temperatures. A Bardin type Hamiltonian with factoring kernel is considered. The derivation is straightforward and is based on evaluating the difference of the free energies per unit volume for the two Hamiltonians and establishing its asymptotic vanishing. This report was presented by Academician M. A. Lavrent'yev 21 September 1965. Orig. art. has: 18 formulas.

SUB CODE: 20, 12/ SUBM DATE: 14Sep65/ ORIG REF: 006

Card 1/1 UDC: 537.312.62

L 26672-66 EWT(1)/T IJP(c) GG/AT
ACC NR: AP6007176 SOURCE CODE: UR/0188/66/000/001/0094/0104

AUTHOR: Bogolyubov (Jr.), N. N. 68 B

ORG: Department of Theoretical Physics, MGU (Kafedra teoreticheskoy fiziki MGU)

TITLE: Asymptotically exact calculation of the free energy for a model system in the theory of superconductivity

SOURCE: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 1, 1966, 94-104

TOPIC TAGS: superconductivity, asymptotic calculation, free energy, correlation function, Green function

ABSTRACT: The author constructs a new method of obtaining an asymptotically exact solution for a Bardeen model of a superconductor. It is shown by this method with mathematical rigor that the difference between the calculated free energy and the true energy is indeed asymptotically small even at a temperature larger than zero. The analysis is based on introducing an intermediate Hamiltonian consist-

Card 1/2 UDC: 537.312.62

L 26672-66

ACC NR: AP6007176 0

ing of the basic superconductivity Hamiltonian with Fermi amplitudes and an additional term containing a complex parameter. The calculated free energies per unit volume with the aid of the model Hamiltonian and with an approximating Hamiltonian are asymptotically close to each other. The results obtained are valid for both zero and above-zero temperature. The configuration integral and the free energy are calculated for both Hamiltonians and the asymptotic vanishing of the difference between the two energies is demonstrated with the aid of the Holder inequality. It is shown in the conclusion that on the basis of the considered model and the approximating Hamiltonian it is possible to correctly calculate asymptotically the correlation functions and the Green's functions of the theory. Orig. art. has: 22 formulas.

SUB CODE: 20/ SUBM DATE: 29Oct64/ ORIG REF: 005/ OTH REF: 001

Card 2/2 BLG

PA 175T57

BOGOLYUBOV, N. S.

USSR/Medicine - Biological Stimulants 11 Jan 51

"Biological Activity of Humic Acids From Soil and Peat," V. A. Biber, N. S. Bogolyubov, Ukrainian Exptl Inst for Eye Diseases imeni V. P. Filatov

"Dok Ak Nauk SSSR" Vol LXXVI, No 2, pp 313-316

Humic acids in question are biologically active substances. Acid from black soil is more effective than that from peat in stimulating fermentation, sprouting of seeds, and healing of skin injuries in exptl animals. Differences in activity between the humic acids are apparently caused by differences in chem constitution as established by S. S. Dragunov.

175T57

BOGOLYUBOV, P. N.

Opyt mekhanizatsii ucheta na mashinostroitel'nom zavode [Mechanizing accounting in a machine-building plant]. Gosstatizdat, 1952. 220 p.

SO: Monthly List of Russian Accessions Vol. 6 No. 7 October 1953

L 00257-67 EWT(d)/EWT(v)/EWT(k)/EWT(h)/EWP(1)
ACC NR: AP6019953 (A,N) SOURCE CODE: UR/0413/66/000/015/0131/0132

INVENTORS: Fal'kov, L. G.; Rutskiy, V. V.; Simkin, Yo. L.; Rubin, A. Ya.; Marinskiy, F. I.; Bogolyubov, S. A.; Shakhovnina, G. V.; Chalov, V. S.; Rabinov, A. I.; Pivkov, P. M.; Ivanov, K. V.

ORG: none

TITLE: Movable apparatus. Class 49, No. 184584

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 131-132

TOPIC TAGS: metalworking, gas welding, metal welding, welding equipment, welding technology, milling machine

ABSTRACT: This Author Certificate presents a movable apparatus for machining the edges prior to welding two large objects. The apparatus contains a milling head mounted on self-propelled carriages. The head is fed axially along the outline of a detail by a pantographic copying mechanism. To increase the efficiency and the accuracy in milling the edges located on any plane upon an immovable structure, the self-propelled carriages are placed on the surfaces being machined (see Fig. 1). The apparatus itself is provided with an auxiliary milling head for machining the opposite edge facing the first one. The edges are separated by gas cutting torches placed in front of the moving apparatus.

Card 1/2 UDC: 621.914.37-182.3:621.791.945.021

L 09257-67
ACC NR: AP6029953

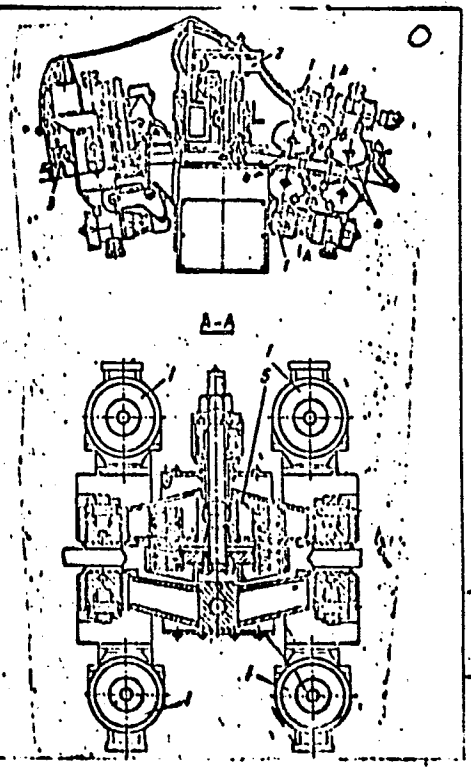

Fig. 1. 1 - self-propelled carriages; 2 - milling heads; 3 - gas cutting torches; 4 - running rollers; 5 - coupling device

Orig. art. has: 1 figure.

[illegible]: 13/ SUBM DATE: 20May64

BOGOLYUBOV, S.K.; IONOV, S.M., inzhener, redaktor; MATVEYEVA, Ye.N., tekhnicheskiy redaktor.

[Geometrical drawing] Geometricheskoe cherchenie. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1954. 14 posters. (Geometrical drawing)

BOGOLYUBOV, Sergey Konstantinovich; BRITKIN, A.S., professor, retsenzent; VOINOV, A.V., inzhener, redaktor; POPOVA, S.M., tekhnicheskiy redaktor; TIKHONOV, A.Ya., tekhnicheskiy redaktor

[Problem book on mechanical drawing] Zadachnik po cherocheniiu. Izd. 3-e, ispr. i dop. Moskva, Ges. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1956. 264 p. (MLRA 10:4)
(Machinery--Drawing)

BOGOLYUBOV, Sergey Konstantinovich; IVANOV, Yu.B., kand.tekhn.nauk, red.; YEGORKINA, L.I., red.izd-va; KL'KIND, V.D., tekhn.red.

[Exercises in designing machine parts] Zadaniia po detalirovaniiu. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1961. 62 p. (MIRA 14:4)

(Machinery--Design and construction)

BOGOLYUBOV, S.K.; IVANOV, Yu.B., kand.tekhn.nauk, red.; CHERNOVA, Z.I., tekhn.red.

[Problems in mechanical drawing] Zadachnik po cherocheniiu. Izd.4., ispr. i dop. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1961. 272 p. (MIRA 14:4)
(Mechanical drawing)

BOGOLYUBOV, Sergey Konstantinovich; VOINOV, Aleksandr Vasil'yevich; OSADCHENKO, V.A., inzh., retsenzent; IVANOV, Yu.B., kand. tekhn. nauk, red.; HYSTRITSKAYA, V.V., red. izd-va; UVAROVA, A.F., tekhn. red.

[Course in technical drawing] Kurs tekhnicheskogo cherecheniia. Moskva, Mashgiz, 1962. 358 p. (MIRA 15:6)
(Mechanical drawing)

BOGOLYUBOV, S.K.

[Problems in mechanical drawing] Zadachnik po cherchcniiu . Moskva, Mashinostroenie, 1964. 274 p. (MIRA 18:1)

BOGOLYUBOV, S.N., kandidat geograficheskikh nauk

Observations established showing rates of surface runoff under snow. Meteor.i gidrol.no.1:54-56 Ja '52. (MLRA 8:9)

1. Gosudarstvennyy gidrologicheskiy institut, Leningrad.
(Runoff)