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Introductory Remarks

- General Theory of Irrevrsible Processes in Gases I.
 - Theory of Boltzmann and Gibbs 1.
 - Explicitly Irreversible Theories 2. The Master Equation in classical theory Α. Quantum theory of irreversible processes Β.
- The Boltzmann Equation and the Fokker-Pjanck Equation II.
 - 1. The Boltzmann Equation
 - The Equation of Change and Conservation Laws 2.
 - Solution of the Boltzmann Equation: the Normal 3. Solution Method of Chapman and Enskog
 - 3A. Solution of the Inhomogeneous Integral Equation (II.36) 3B. Method of Thirteen-Moments of Grad

 - Basic Assumptions and Limitations of the Boltzmann 4. Equation
 - 5. The Fokker-Planck Equation
 - Relation between the Boltzmann and the Fokker-Planck 6. Equation
- III. Theories of Bogoliubov and of Frieman and Sandri for Neutral Gases
 - The B-B-G-K-Y Hierarchy of Equations and the 1. Hydrodynamical Equations
 - 2. The Basic Ideas of the Bogoliubov Theory
 - 3. The Kinetic Stage
 - i) Integration of the equations of motion the operator Z_t ii) Expansion in powers of density

 - iii) The "functional Ansatz"
 - iv) The "initial conditions" introduction of a time arrow
 - v) Solution of the fundamental equations (III.33-40)
 - vi) First approximation: the generalized Boltzmann equation
 - 4. The Equilibrium State
 - Theory of Frieman and Sandri: the kinetic stage 5.
 - Theory of Frieman and Sandri: the hydrodynamical stage 6.

- Bogoliubov's Theory: Work of Choh and Uhlenbeck on the IV. Hydrodynamical Stage
 - Expansion for Short-Ranged Interactions 1.
 - The Basic Equations of the Hydrodynamical Stage 2.
 - Solution of the Basic Equations 3. i) Zeroth order in the uniformity parameter ii) First order in the uniformity parameter

 - β) Second order in density
 - Results of Choh and Uhlenbeck 4.
 - Kinetic Equation for Ionized Gases Theory of Vlasov v. and Landau
 - Introductory Remarks 1.

 - 2. Vlasov Equation 2A. Relativistic Vlasov Equation
 - Some Stationary State Solutions of the Vlasov Equation 3. i) Uniform spatial distribution
 - ii) Periodic spatial solution
 - *) Linear theory
 - **b**) Nonlinear theory
 - 4. Time-Dependent Solution: Plasma Oscillations
 - 5. Landau Damping
 - 6. Stability of Plasma Oscillations
- Kinetic Equation of Plasmas on the Basis of the Bogoliubov VI. Theory
 - The Boltzmann and the Fokker-Planck Equation with 1. Cutoff
 - 2. Extension of Bogoliubov's Theory to Plasmas
 - 3. Theory of Guernsey
 - Homogeneous Plasmas: the Balescu-Lenard-Guernsey 4. Equation
 - 5. The Equilibrium State
 - i) The H-Theorem
 - ii) The two-particle correlation function:
 - Debye-Hückel approximation and the exact theory
 - Justification for the Boltzmann Equation with the 6. Debye-Hückel Screened Potential
 - The Spectrum of Relaxation Times of a Homogeneous . 7. Plasma

- Relation with the Fokker-Planck Equation 8.
- Kinetic Equation of Plasmas: Other Theories VII.
 - Theory of Ichikawa and Guernsey 1.
 - i) Method of Ichikawa and Guernsey
 - ii) The equilibrium state
 - iii) Spatially homogeneous plasmas
 - iv) Small deviations from the equilibrium distribution
 - v) Approximations of Ichikawa
 - vi) Other approximations
 - 2. Theory of "rieman and Sandri
 - Attempts to Remove the Divergence at r = 0 for 3. Coulomb Interactions
- VIII. Kinetic Equation of Plasmas: Inhomogeneous Plasmas
 - Kinetic Equation on the Basis of Bogoliubov-Type 1. Theory
 - 2. Transport Coefficients
 - IX. Plasmas in Electric and Magnetic Fields
 - Kinetic Equation in Static Electric and Magnetic 1. Fields
 - i) Weak fields
 - ii) Strong magnetic field

 - α) Homogeneous plasmas β) Inhomogeneous plasmas
 - 2. Magnetohydrodynamical Equations
 - x. Theory of Prigogine and Balescu
 - 1. Distribution Functions and Their Fourier Components
 - 2. Liouville Equation in Fourier Transforms - Diagrams
 - 3. Asymptotic Dependence of the Diagrams on N, V and t
 - 4. Initial Conditions
 - 5. Irreversibility .
 - Time Scales 6.
 - 7. Two-Particle Distribution Function
 - 8. Kinetic Equation of Plasmas