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Stationary Solutions of the Bogoliubov Hierarchy Equations in Classical Statistical Mechanics. 3

B. M. Gurevich

Laboratory of Mathematical Statistics, Department of Mechanics and Mathematics, Moscow State University, Moscow, USSR

Yu. M. Suhov*

Centre de Physique Théorique, CNRS, F-Marseille, and I.H.E.S., F-Bures-sur-Yvette, France

Abstract. We continue the analysis of the "conjugate" equation for the generating function of a Gibbs random point field corresponding to a stationary solution of the classical BBGKY hierarchy. This equation was established and partially investigated in the preceding papers under the same title. In the present paper we reduce a general theorem about the form of solutions of the "conjugate" equation to a statement which relates to a special case where the interacting particles constitute a "quasi"—one dimensional configuration.

0. Introduction

This paper continues the preceding papers of the authors [1, 2]. We continue here the proof of Main Theorem, more precisely, of its part which was formulated as Theorem 2, **1**[1]. Theorem 2′ proved in [2] contains the assertion of Theorem 2, **1** for the case $n_0=2$ and is the initial step of the inductive proof for arbitrary $n_0 \geqq 2$ (for the notations used without definitions, see [1, 2]). The purpose of this part of the work is to reduce Theorem 2, **1** to a special case where the configuration of interacting particles is represented by a one-dimensional graph ("chain"). The corresponding assertion (Basic Lemma) is formulated in Section 2 and will be proved in a separate paper.

In this Section we follow the assumptions of [1]. On account of Theorem 2′, **2** as the initial inductive step w.r.t. n_0, it is not hard to see that Theorem 2, **1** follow from:

Theorem 0.1. *Let $U(r)$ obey $(I_1, \mathbf{1}-I_4, \mathbf{1})$ and $f(\bar{x})$ obey $(G_1, \mathbf{1}-G_6, \mathbf{1})$ with $n_0 \geqq 3$. Suppose U and f satisfy Equation* (2.8, **1**)*:*

$$\{f(\bar{x}), H(\bar{x})\} + \sum_{y\in\bar{x}} \{f(\bar{x}\backslash y), U(\bar{x}\backslash y|y)\} = 0, \qquad \bar{x}\in D^0. \tag{0.1}$$

Then $f(\bar{x})=0$ for any $\bar{x}\in M_{n_0}\cap D^0$.

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* Permanent address: Institute for Problems of Information Transmission, USSR Academy of Sciences, Moscow, USSR

1 As in [2], we mark the references to [1] by the index **1**. The references to [2] are marked by the index **2**