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On the Characterization of Relativistic Quantum Field Theories in Terms of Finitely Many Vacuum Expectation Values. II

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Abstract. The problem of uniqueness of monotone continuous linear extensions of

$$T_{(2N)}=\{1, T_1, \ldots, T_{2N}\}\in E'_{(2N)}=\prod_{n=0}^{2N} E'_n$$

is solved. A characterization of a relativistic QFT in terms of finitely many VEV's is derived. All results are illustrated by an explicit discussion of the extension problem for special cases of $T_{(4)}=\{1,0,T_2,T_3,T_4\}$. This discussion contains explicitly necessary and sufficient conditions on $T_{(4)}$ for the existence of minimal extensions and some convenient sufficient conditions.

1. Introduction

This note continues the discussion of the problem of characterizing a relativistic Quantum Field Theory by finitely many vacuum expectation values which we started in [1].

While the first part contains

(i) an exposition of the problem (which is shown to be the problem of monotone continuous linear extension with additional linear constraints),

(ii) a suggestion for constructing monotone continuous linear (m.c.l.) extensions,

(iii) the definition and some discussion on the relevance of the notion of minimal extensions,

(iv) necessary and sufficient conditions for the existence of minimal extensions,

(v) several applications to the simplest cases;

this part concentrates on

(i) the problem of uniqueness of m.c.l. extension,

(ii) minimal extensions in relativistic QFT,

(iii) the characterization of a relativistic QFT by $T_{(4)}=\{1,T_1,T_2,T_3,T_4\}$ (notation as in 1).

The problem of uniqueness of m.c.l. extension is solved in the following way (we use the notations of 1): The notion of a m.c.l. functional to be 'uniquely

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