CONSTRUCTION OF \((\lambda\phi^4 - \sigma\phi^2 - \mu\phi)^3\) QUANTUM FIELD MODELS

by

Y. M. PARK

Department of Theoretical Physics
University of Bielefeld
48 Bielefeld 1, F.R. Germany

and

Department of Mathematics
Yonsei University, Seoul, Korea

TABLE OF CONTENTS

1. Introduction
2. Notation, Definitions and Models
3. Theories in a Finite Volume

+ Lecture given at XV. Internationale Universitätswochen für Kernphysik, Schladming, Austria, February 16-27, 1976.
++ Supported in part by Korean Traders Scholarship Foundation.
+++ Permanent Adress after September 1, 1976.
This lecture is intended to introduce the audience to some constructions of theories for the boson field models in three dimensional space-time, which exhibit ultraviolet divergences. Constructive quantum field theory has developed rapidly in the past few years. The polynomial interactions in two dimensional space-time (the $P(\phi)^2$ models) are the best behaved models and its detailed structure is now well-known [2, 12, 16, 18, 19, 23, 24, 28, 30, 36, 37, 40]. Most of you may have already been exposed in the construction of the $P(\phi)^2$ field model elsewhere (at least, you will have a change again in Prof. Challifour's lecture at this school) and so I will not discuss that subject. The $(\lambda\phi^4-\sigma\phi^2-\mu\phi)$ interactions in three dimensional space-time (the $(\lambda\phi^4-\sigma\phi^2-\mu\phi)_3$ models), which we are considering here, are the next well behaved models. These differ from $P(\phi)^2$ by having ultraviolet