Computer-Aided Experimentation:
Interfacing to Minicomputers

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Computer-Aided Experimentation

To Marilyn,
Howie, Meryl, Stuie
and in
Memory of my father

Preface

This book is based on a course in computer-aided experimentation given to scientists and graduate students at the Weizmann Institute of Science. The purpose of the course and of the book is to familiarize scientists and engineers with the basic concepts and techniques needed to specify, design, and implement experiments that are computer controlled.

It is my opinion that better science results when many of the tedious, time consuming jobs in data taking and parameter adjustment and variation are under the direction of a computer. Computer aided experimentation permits the design of experiments that are either extremely difficult or impossible without a computer because of the rate of data acquisition, the numbers of data to be collected, and the need to make adjustments on line in real time as a response to the direction the experiment is taking. When properly applied, computer aided experimentation relieves the scientist from the ordinary repetitive tasks and frees him to devote more of his time to creative activities.

This book describes the various components in a computer aided experiment. Suggested criteria for the selection of system elements are analyzed. Design techniques are described with many examples of practical connections being given.

This book is designed both as a textbook and as a quick refresher on particular topics. It can be read through one chapter after the other when used as a textbook. In this way a comprehensive picture of interface design is obtained. It can also be used as a means of familiarization with a topic out of sequence, since each chapter is designed to be readable as an independent entity without the need to refer to previous chapters. In this way the scientist or practicing engineer can become familiar with a topic without reading more than the chapter of interest. To the extent possible all the major topics needed in interface specification and design are covered.

I wish to express my gratitude to the late Professor Amos de Shalit of the Weizmann Institute of Science for his encouragement and direction in setting up at the Feinberg Graduate School the course upon which the book is based. My thanks to Ruth Mauer, who suggested writing this book. I am grateful also to Miss Ronit Levy, who faithfully typed this manuscript.

JULES FINKEL

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