Preface

Stochastic orders, i.e., ordering relations between probability distributions, are basic to many models in probability and statistics, operations research, and economics. The analysis of stochastic orders and the exploitation of their properties give rise to a plenty of results such as: probability inequalities, ordinal measures of dispersion, bounds for parameters of stochastic systems, characterizations of stochastic dependence, and many more.

The systematic study of stochastic orders appears to be a rather young activity. While particular stochastic orders have already been investigated by Hardy, Littlewood and Polya (1967), Karamata (1932), Lehmann (1955), and later by many subsequent researchers, the first comprehensive treatments of stochastic orders have been given by Stoyan (1977, 1983) and Mosler (1982). Closely related are three fields of investigation which have proved rather active during recent years: probability inequalities (Tong 1980, 1982), majorization (Marshall and Olkin 1979), and dependent variables (Block et al. 1991).

On May 16 to 20, 1989, an international workshop was held in Hamburg, Germany, under the title "Stochastic Orders and Decision under Risk". The aim of the workshop was to contribute to the theory and applications of stochastic orders and to gather scientists from different disciplines who were using the similar mathematical tools in their fields. In fact, the Hamburg workshop gathered people from probability theory, statistics, reliability, queueing, economics, finance, insurance and mathematical physics.

The present volume contains a selection of papers, most of which were presented in Hamburg. Since communication between scholars working in different fields was a major goal of the workshop, most of the papers include expository parts and many of them survey some larger or smaller area.

The general theory of stochastic orders is treated by Bergmann, Marshall, and Mosler and Scarsini. The Lorenz ordering is investigated in two papers by Arnold and Arnold and Villaseñor. The fields of applications can be coarsely divided into the following three areas: (1) Probability theory and statistics with the subareas (a) probability inequalities, (b) statistics, and (c) stochastic processes. (2) Operations research with (a) reliability and (b) queueing. (3) Economics. (4) Insurance and finance. Probability inequalities (1a) are the primary topic of Block et al., Eaton and Perlman, Rüschendorf, and also Bergmann. Statistics (1b) is treated in Torgersen's paper on the comparison of experiments and *passim* in other papers. Other topics of probability theory – partly geometric ones – are investigated by Vitale, Abraham and Newman, Giovagnoli and Regoli, and Yitzhaki and Olkin. Arjas and Norros, Luschgy, and Massey deal with stochastic processes (1c); reliability theory (2a) is addressed by the following authors: Arjas and Norros, Costantini and Spizzichino, Gaede, Savits, and Shaked and Shanthikumar. Massey's paper is about queueing (2b). Economics (3) is represented by Jewitt and by LeBreton,