# *Preface*

Stochastic orders and ageing classes are being used at an accelerate rate in many diverse areas of Probability and Statistics, whereas the entropy has been used to measure uncertainty. In the literature, different types of stochastic ordering and ageing classes are available. This thesis presents some new orderings and ageing classes in terms of distribution function as well as entropy, and illustrates their usefulness and applicability. The thesis is arranged as follows.

In Chapter 1, we give a survey of literature as well as a brief overall introduction about the thesis. Residual entropy, past entropy and their generalized versions are discussed in Chapters 2 and 3. Chapter 4 contains order statistic results of random variables when the sample size is random. Some properties of reversed residual life, including some new orderings and ageing classes based on it are given in Chapter 5. We propose a new test statistic to test reversed hazard rate function in Chapter 6. Some results on $DMRL$ class are studied in Chapter 7. In Chapter 8, we have estimated the age replacement policy when minimal repair is undertaken at failure.

The research work reported by me in this thesis is done during February 2001 - March 2005, under the supervision of Dr. Asok K. Nanda, Department of Mathematics, IIT Kharagpur, India. The following research papers have been prepared based on different chapters of the thesis.

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1. Reliability Properties of Reversed Residual Lifetime (2003). *Communications in Statistics-Theory & Methods*, **32(10)**, 2031-2042. [Addendum: *Communications in Statistics-Theory & Methods* (2004), **33(4)**, 991-992.]

2. Tests for Reversed Hazard Rate Function (2003). *Calcutta Statistical Association Bulletin*, **54(215-216)**, 181-193.