Life distributions in survival analysis and reliability: Structure of nonparametric, semiparametric and parametric families

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In this talk I will discuss some of the characteristics of life distributions that arise in survival analysis and reliability theory. Alternative definitions of a distribution are discussed and then related to a variety of stochastic orders: hazard rate order, likelihood ratio order, convex order, Lorenz order. Nonparametric families, in particular log concave densities, completely monotone distributions , increasing hazard rate families, new-better-than-used families and bathtub hazard rate families are analyzed. A taxonomy for semiparametric families is presented and the effect of introducing parameters on various stochastic orders is shown. Finally, the introduction of covariate models in these families is developed.