Abstract

The thesis entitled **"Information-Theoretic Measures Based Residual Lifetime Distribution Functions"** comprises seven chapters organized as follows;

Chapter 1 is introductory in nature presenting a brief account of the available literature and the various information measures proposed by the researchers. Some basic concepts of reliability, including that of proportional hazard model (PHM), proportional reversed hazard model (PRHM) and length biased model, have also been discussed.

In **Chapter 2**, we have considered Havrda and Charvat (1967) measure of entropy which is a one parameter generalization of the Shannon entropy and is non-additive in nature. We have proposed a residual measure of entropy based on it and have proved a characterization theorem that the proposed measure determines the distribution function uniquely. Also we have characterized some specific probability distributions based on the proposed measure. The work reported in this chapter has been published in the papers entitled, **Non-additive Entropy Measure Based Residual Lifetime Distributions** in *JMI International Journal of Mathematical Sciences*, 2010, 1 (2), 1-9, and, **A Generalized Entropy- Based Residual Lifetime Distribution** in *International Journal of Biomathematics*, 2011, 4 (2), 171-184.

In **Chapter 3**, we have conceptualized the idea of dynamic measure of inaccuracy, both residual and past. In case of residual inaccuracy measure we have studied the characterization result using proportional hazard model; and in case of past inaccuracy measure we have studied this using proportional reversed hazard model. Also we have characterized some specific distributions based on these measures. The work reported in this chapter has been published in the papers entitled, **A Dynamic Measure of Inaccuracy Between Two Residual Lifetime Distributions** in *International Mathematical Forum*, 2009, 4 (25), 1213-1220, and, **A Dynamic Measure of Inaccuracy Between Two Past Lifetime Distributions** in *Metrika*, 2010, 74 (1), 1-10.

In **Chapter 4**, the results of Chapter 3 have been extended to weighted distributions, a concept of considerable importance. Taking weights $w(x) = x$, we have introduced length biased measures of residual and past inaccuracies and have studied their respective characterization theorems, and other prop-

erties. The results reported in this chapter have been published in the papers entitled, **Length Biased Weighted Residual Inaccuracy Measure** in *Metron*, 2010, LXVIII (2), 153-160, and, **On Length Biased Dynamic Measure of Past Inaccuracy** in *Metrika*, 2012, 75 (1), 73-84. Also some results were presented at *International Conference in Mathematics and Applications* held in *Bangkok* on Dec. 19-21, 2009.

In **Chapter 5**, we have generalized the concept of cumulative residual entropy measure to one parameter and two parameters entropies, and have studied their dynamic versions and characterization results. The exponential, Pareto and finite range distribution, which are commonly used in reliability modeling, have been characterized in terms of generalized cumulative residual entropy measures. The work reported in this chapter has been published in the papers entitled, **On Dynamic Renyi Cumulative Residual Entropy Measure** in *Journal of Statistical Theory and Applications*, 2011, 10 (3), 491-500, and, **Some Characterization Results on Generalized Cumulative Residual Entropy Measure** in *Statistics and Probability Letters*, 2011, 81 (8), 72-77. Also some results were presented at *International Congress of Mathematicians (ICM)* held in *Hyderabad* on Aug. 19-27, 2010.

In **Chapter 6**, we have considered dynamic cumulative inaccuracy measures, both residual and past and have studied the characterization results respectively under proportional hazard model and proportional reversed hazard model. Also we have characterized certain specific probability distributions using relation between different reliability measure. It is expected that dynamic cumulative inaccuracy measures introduced will further extend the scope of study. The work reported in this chapter has been published in the paper entitled, **On Dynamic Cumulative Residual Inaccuracy Measure** in proceeding of the *World Congress on Engineering (WCE)*, held in *London* on July 4-6 2012, and, some results have been communicated for publication.

In **Chapter 7**, we have concluded the findings of the work carried out in this thesis and also have presented further scope of work. During the present investigation, several ideas have originated which have the potential to extend the study further. We can consider the proposed dynamic measures further for discrete cases, since practically discrete cases are suitable from application point of view. Further the discrete measure of the dynamic version proposed can possibly find wider applications in different area of interest. The work reported in this thesis can be extended to bivariate and multivariate domains.