

Can Data Recognize Its Parent Distribution?

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Abstract:

This study is concerned with model selection of lifetime and survival distributions arising in engineering reliability or in the medical sciences. We compare various distributions, including the gamma, Weibull and lognormal, with a new distribution called geometric extreme exponential. Except for the lognormal distribution, the other three distributions all have the exponential distribution as special cases. A Monte Carlo simulation was performed to determine sample sizes for which survival distributions can distinguish data generated by their own families. Two methods for decision are by maximum likelihood and by Kolmogorov distance. Neither method is uniformly best. The probability of correct selection with more than one alternative shows some surprising results when the choices are close to the exponential distribution.