Abstract

In this thesis, a new distribution was presented which is called Rayleigh-Pareto based on the generalization formula for Rayleigh distribution, by adding two parameters to the shape in order to obtain a new distribution with three parameters. It is hoped that this distribution will be more flexible and suitable for application, especially in the field of complex and large data. Probability and the aggregate function, as well as providing extended formulas for them. Some important properties of the distribution were also presented, such as the rth moment, mean, variance, skewness and kurtosis coefficient, the moment-generating function, the characteristic function, and ordered statistics.

Three methods were also proposed to estimate the distribution parameters, which are the method of maximum likelihood , the method of least squares, and the method of estimation based on percentiles. Also, a comparison was presented between the three methods using simulation method to show the extent of the efficiency of each method and its preference based on the standard of mean squares error. The simulation results showed the percentiles method, then it was followed by the maximum likelihood, while the least squares ranked last. It was also applied to data in the domain of the work field, and the new distribution showed more suitability for the experimental data distribution compared to the original Pareto distribution.