POSSIBILISTIC STATISTIC

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ABSTRCT

This paper deals with the possibilistic distribution described as

$$\xi \sim Q_{\mu}(a,b)$$

where ξ is a possibilistic variable (p.v), $Q_{\mu}(a,b)$ is it's distributed function, μ is a fuzzy number, a and b (b>0) are two real parameters. It is assumed in this paper that μ is a 0-symmetric fuzzy number and $Q_{\mu}(a,b)$ is defined by

$$Q_{\mu}(a,b)(x)=P_{\pi}(\xi=x)=\mu((x-a)/b) \qquad \forall x\in R$$

where $P_{\pi}(\cdot)$ is a possibilistic measure. The concept of possibilistic independence will be introduced and the term statistic will be used to indicate a function of the possibilistic variables which does not involve the unknown parameter. Let $\xi_1,\cdots,\xi_n$ be independent identically distributed (i.i.d) possibilistic variables, the problem is to find out statistic which should be have some good statistic properties to estimate the parameters and test the parametric hypotheses. In this paper, some statistic will be constructed, their distributed function will be studied.

Let ((M+m)/2, M-m) be the estimator of (a,b), where $M=\mathrm{Max}(\xi_1,\cdots,\xi_n)$, $m=\min(\xi_1,\cdots,\xi_n)$, some good properties of the estimator will be obtained. We have the following main results:

(i) ((M+m)/2) is consistency estimator of a and is Maximum likelihood estimator when b is known.

(ii) $((M+m)/2, M-m)$ is sufficient and invariant estimator of (a,b).

Finally, we simply discuss the possibilistic testing hypotheses of a and b. The application of possibilistic statistics has been discussed in a concrete example.

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