On A Generalized R-Norm Entropy

D.S. Hooda
Department of Mathematics and Statistics
CCS Haryana Agricultural University
HISAR – 125004 (India)
e- mail : dshooda@hau.nic.in

Anant Ram
Govt. Senior Secondary School
Ladwa (Kurukshetra)
INDIA

Subtitle

1. *Introduction*

Let Δ_n be a set of all probability distribution associated with a discrete random variable X taking finite number of values $x_1, x_2, \ldots\ldots x_n$, where
$\Delta_n = \{ P= (p_1,p_2,\ldots p_n) , p_i \geq 0 , i = 1,2,\ldots n \text{ and } \Sigma_i^n pi =1\}$
Depending on $P \in \Delta_n$ Boekee and Lubbe have proposed the following information measure :
$H_R (P) = R/R-1 [1- (\Sigma_i^n p_i^R)^{1/R}] , R(>0) \neq 1$ (1)
The measure (1) can be generalized in so many ways, Hooda and Ram considered one parametric generalization and characterized the following measure :
$H_R^{\beta} (P) = R/R+\beta-2 [1- (\Sigma_i^n p_i^{R/2-\beta})^{2-\beta/R}] ,$
$0< \beta \leq 1, \ 0< R+\beta \neq 2, \ R(>0) \neq 1$ (2)

2. *Properties of $H_R^b(P)$*
   We discuss algebraic and analytical properties of the generalized R-norm entropy of degree β given by (2)
3. *Bounds on probability of errors*
   In this section we derive a relation between the probability of error and the conditional generalized measure of R-norm entropy in the form of an inequality

REFERENCES

1. Boekee, D.E., and Lubbe, J.C.A.V.D. (1980): The R- norm information measure, Information and Control, 45, 136-155.
2. Shannon ,C.E. (1948): A Mathematical theory of communication Bell System Tech.Journ.,27, 379-423 and 623-656.
3. Renyi, A. (1961): On measures of entropy and information, Proc. Fourth Berkeley Symp. Maths. Statist. Prob. No. 1, 547-561.
4. Havrda, J.F., and Charvat, F. (1967): Quantification methods of classification process- The Concept of a- entropy, Kybernetika 3, 30-35.
5. Daroczy, Z. (1970): Generalized information functions, Information and Control, 16, 36-51.
6. Hooda. D.S. and Ram. Anant (1998): On a generalized measure of R- norm entropy , accepted for publication in CJMCS.

7. Arimoto, S. (1971): Information theoretical consideration on estimation problems, Inform.. Contr. 19, 181-194.
8. Hardy, G.H., Littlewood, J.E., and Polya, G. (1934): Inequalities, Cambridge University Press.

Resume

The algebraic and analytical properties of the new measure of R-norm entropy, recently characterized by the author , have been studied. A relation has also bee n derived between the probability of error and the conditional generalized measure of R- norm entropy in the form of an inequality which is analogous to Fano bound for Shannon' s entropy.