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Statistical inference for epsilon-entropy and quadratic Renyi entropy

Abstract: Entropy and its various generalizations are widely used in mathematical statistics, communication theory, physical and computer sciences for characterizing the amount of information in a probability distribution. We consider estimators of the quadratic Renyi entropy and some related characteristics of discrete and continuous probability distributions based on the number of coincident (or epsilon-close) vector observations in the corresponding independent and identically distributed sample. We show some asymptotic properties of these estimators (e.g., consistency and asymptotic normality). These estimators can be used in various problems in mathematical statistics and computer science (e.g., distribution identification problems, average case analysis for random databases, approximate pattern matching in bioinformatics).