Some results on lower variance bounds useful in reliability modeling and estimation

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Abstract In the present paper a general theorem that links characterizations of discrete life distributions based on relationship between failure rate and conditional expectations with those in terms of Chernoff-type inequalities is proposed. Exact expression for lower bounds to the variance is calculated for distributions belonging to the modified power series family, Ord family and mixture geometric models. It is shown that the bounds obtained here contain the Cramer–Rao and Chapman–Robbins inequalities as special cases. An application of the results to real data is also provided.

Keywords Characterizations · Chernoff-type inequalities · Failure rate · Unbiased estimation