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Summary: This note shows that the matrix forms of several one-parameter distribution families satisfy a hierarchical low-rank structure. Such families of distributions include binomial, Poisson, and χ² distributions. The proof is based on a uniform relative bound of a related divergence function. Numerical results are provided to confirm the theoretical findings.

MSC:
41A35 Approximation by operators (in particular, by integral operators)
62E17 Approximations to statistical distributions (nonasymptotic)
62H10 Multivariate distribution of statistics
94A15 Information theory (general)

Keywords:
hierarchical low-rankness; parameterized distributions; Kullback-Leibler (KL) divergence

Full Text: DOI arXiv