Asymptotics of the discrete log-concave maximum likelihood estimator

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The assumption of log-concavity is a flexible and appealing nonparametric shape constraint in distribution modeling. In this work, we study the log-concave maximum likelihood estimator (MLE) of a probability mass function (pmf). We show that the MLE is strongly consistent and derive its pointwise asymptotic theory under both the well- and misspecified settings. Our asymptotic results can be used to calculate confidence intervals for the true log-concave pmf. The MLE and
associated confidence intervals may be easily computed using the R package logcondiscr. We illustrate our theoretical results using recent data from the H1N1 pandemic in Ontario, Canada.

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