EM-test for finite mixture models

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Abstract

In many scientific investigations, a population can often be divided into more homogeneous sub-populations. A finite mixture model is then a useful model. Inference on the mixing structure has been an important problem in various disciplines. Developing valid and effective statistical inference procedures on the mixing distribution has been technically challenging. Classical procedures often have sophisticated asymptotic properties which render them useless in applications. Recently, we invent a class of EM-tests that are advantageous in many respects. For a large number of finite mixture models, we have successfully designed corresponding EM-tests whose limiting distributions are easier to derive mathematically, simple for implementation in data analysis. The simulation indicates that the limiting distributions have good precision at approximating the finite sample distributions. A general procedure of selecting tuning parameters has also been developed.