

A formulation for continuous mixtures of multivariate normal distributions

Adelchi Azzalini

University of Padua, Italy

Abstract

Several formulations have long existed in the literature in the form of continuous mixtures of normal variables where a mixing variable operates on the mean or on the variance or on both the mean and the variance of a multivariate normal variable, by changing the nature of these basic constituents from constants to random quantities. More recently, other mixture-type constructions have been introduced, where the core random component, on which the mixing operation operates, is not necessarily normal.

The main aim of the present work is to show that many existing constructions can be encompassed by a formulation where normal variables are mixed using two univariate random variables. For this formulation, we derive various general properties, with focus on the multivariate context.

Within the proposed framework, it is also simpler to formulate new proposals of parametric families, and we provide a few such instances. As a side product, the exposition provides a concise compendium of the main constructions of continuous normal-mixtures type, although a full overview of this vast theme is not attempted.