
A Review of Dispersion Models Generated by Tilting

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Abstract

We review recent results on dispersion models generated by a tilting operator acting on a generating function, similar to exponential dispersion models, which are generated by exponential tilting acting on the cumulant generating function. Other cases include extreme, geometric and factorial dispersion models. These models are important for modelling non-normal response variables in generalized linear regression models, but here we concentrate on their distributional properties. A key ingredient for each type of dispersion model is the associated dispersion function, which is a useful characterization and convergence tool, much like the variance function for exponential dispersion models. In particular, dispersion models corresponding to power dispersion functions appear as scaling or dilation limits, similar to the Tweedie convergence theorem for exponential dispersion models.

Keywords: dispersion function; exponential tilting; generating function; reproductive dispersion model.