



## The multivariate Gamma-GLG model from the random intercept Gamma model with random effect nonnormal

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We propose in this paper a random intercept gamma model in which the random effect is assumed to follow a generalized log-gamma (GLG) distribution. This flexibilization in which has been suggested by Fabio et al. (2012) allows distributions for the random effect skew to the right and skew to the left and has the normal distribution as a particular case. For a particular parametrization for the GLG distribution and specifying the adequate link function, we derive a new continuous multivariate distribution named Gamma-GLG and its moments. We also developed an iterative process based on Newton Raphson methods for the parameters estimates of the multivariate model. The deviance function and residual analysis are proposed and an applications with real data is given for illustration.

**Keywords:** Gamma-GLG multivariate model; Generalized linear models; Generalized log-gamma distribution; Random-effect models; Residual analysis.