

Variable	Distribution	Description
$y_{nc}$	Negative Binomial	Single-cell counts
$s_n$	None	Cell size factor
$z_n$	Categorical	Cell type indicator
$\phi_{ngc}$	Deterministic $f^n$	Negative binomial dispersion
$\delta_{gc}$	Log-Normal	Marker over-expression
$\rho_{gc}$	None	Marker-cell type matrix
$x_{np}$	None	Covariates (batch or sample)
$\beta_{pg}$	Gaussian	Covariate coefficients
$a, b$	None	Dispersion basis coefficients