

Binomial Likelihood Function

$$\mathcal{L}(p \mid n, y) = \binom{n}{y} p^y (1-p)^{n-y}$$

MATLAB implementation:

$$\text{nchoosek}(n,y) * (p.^y) * ((1-p).^{(n-y)})$$

Log Binomial Likelihood Function

(exponential expressed as sum of logs)

$$\log_e \left(\mathcal{L}(p \mid n, y) \right) = \log_e \left(\binom{n}{y} \right) + y \cdot \log_e(p) + (n - y) \cdot \log_e(1 - p)$$

(first term is constant; independent of model parameters)

MATLAB implementation:

$$\text{sum}((y.*\log(p)) + ((n-y) * \log(1-p)))$$

GRTInL.m and DEMInL.m implementations:

$$-\text{sum}((\text{data}.*\log(\text{predP})) + ((N-\text{data}).*\log(1-\text{predP})))$$