

Simplex Diffusion HMM

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Dirichlet distribution

$$p(\{x_i\}|\{\alpha_i\}) = \frac{\Gamma(A)}{\prod_{i=1}^K \Gamma(\alpha_i)} \prod_{i=1}^K x_i^{\alpha_i-1} \quad (1)$$

with $A = \sum_i \alpha_i$.

The log of the dirichlet function is then

$$\log p(\{x_i\}|\{\alpha_i\}) = \left(\log \Gamma(A) - \sum_{i=1}^K \log \Gamma(\alpha_i) \right) \sum_{i=1}^K (\alpha_i - 1) \log(x_i) \quad (2)$$