Likelihood Function and Barycentric Coordinates

Daniel Sadoc Menasche

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Likelihood Function

- Given
  - unknown parameters X
    - mean of distribution, variance of distribution, class of fish, ...
  - data D
    - samples, size of fish, ...
- Looking for
  - $P(X = x|D = d)$
- Known
  - Likelihood of $D = d$ given $X = x$: $P(D = d|X = x)$

Two Ways To Look at Likelihood

- Density function
  - $P(D = d|X = x)$, varying d, plot $P(D = d|X = x)$
  - $d \rightarrow P(D = d|X = x)$
  - $\mathbb{R} \rightarrow \mathbb{R}$
- Likelihood function
  - $P(D = d|X = x)$, varying x, plot $P(D = d|X = x)$
  - $x \rightarrow P(D = d|X = x)$
  - $\mathbb{R} \rightarrow \mathbb{R}$

Multinomial With Three Types

- Domain of parameters is given by ternary plot
  `http://en.wikipedia.org/wiki/Ternary_plot`
- Barycentric coordinates are helpful