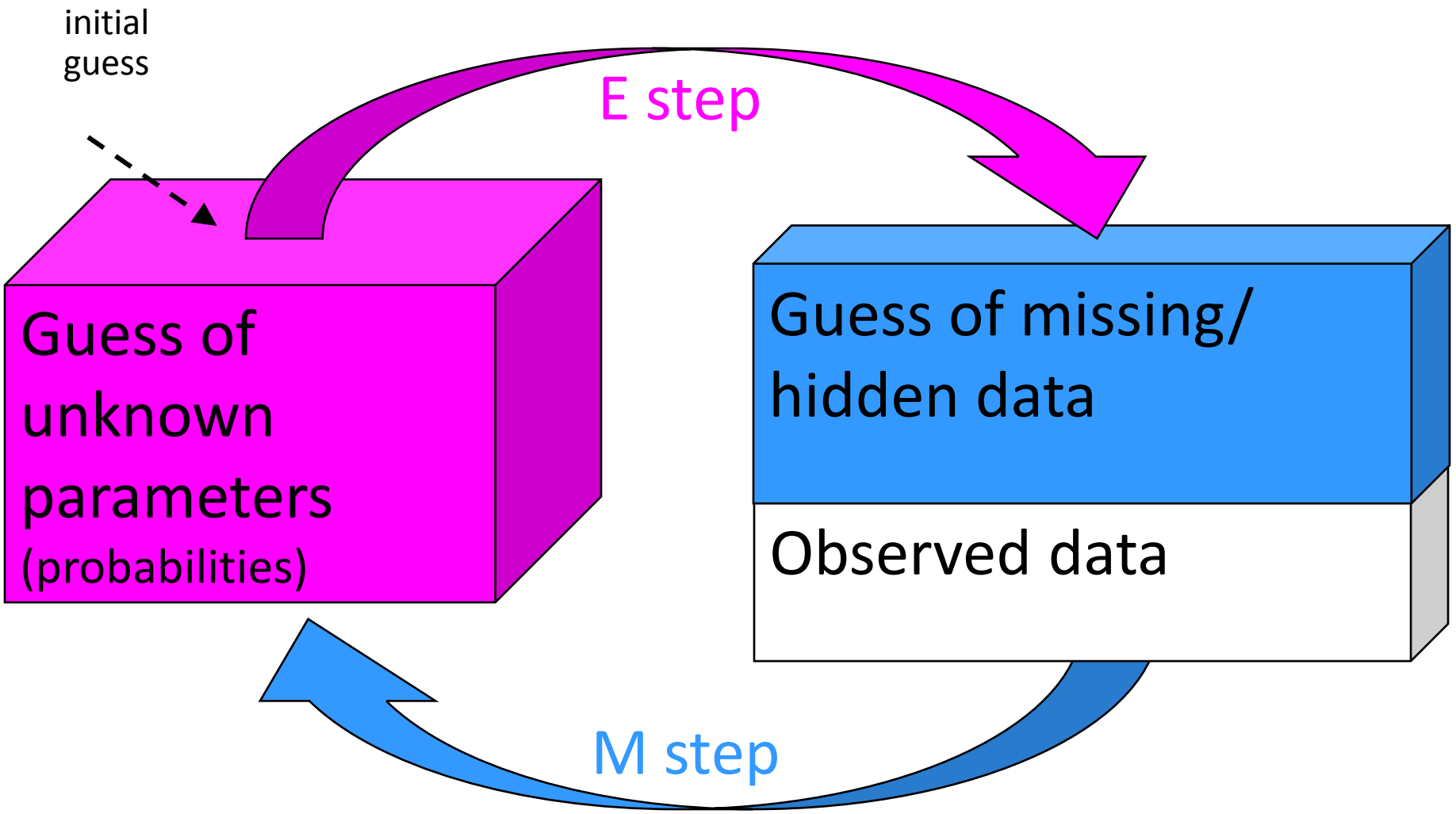
General Idea of EM



EM: Example

- Coin tossing example

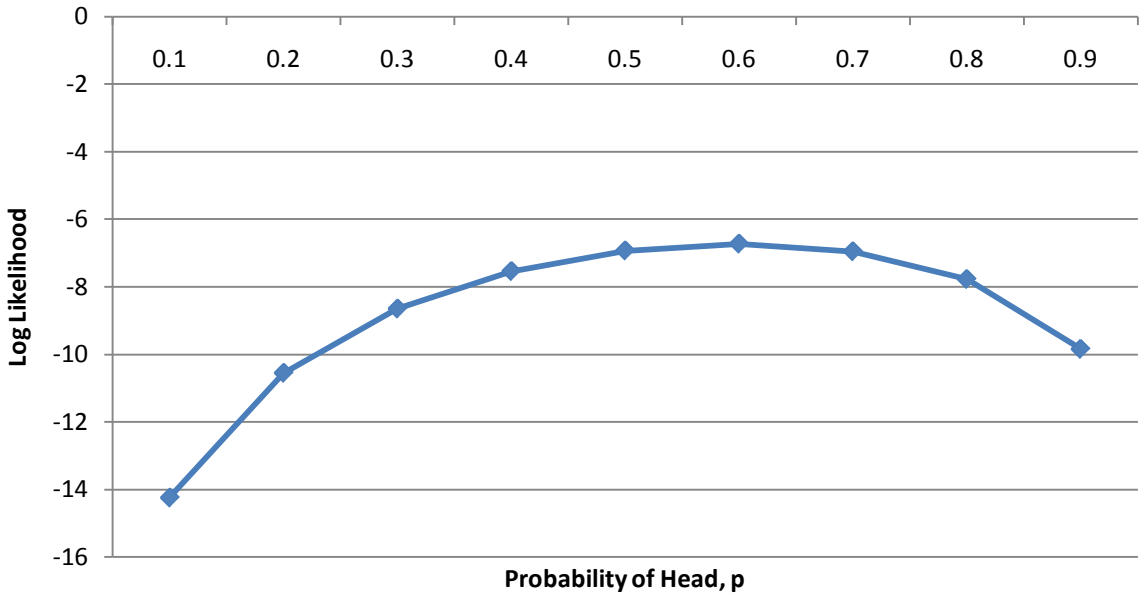
$$D=\{H, H, T, T, H, ?, H, H, ?, T, T, H\}$$

Parameters: M
Probability of Head: p
Probability of Tail: q = 1-p

- Goal: Find the parameters and missing value that maximize the likelihood

Example (Contd..)

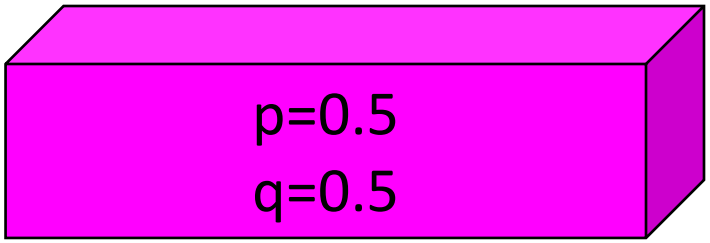
- Likelihood Curve for picking the base parameter

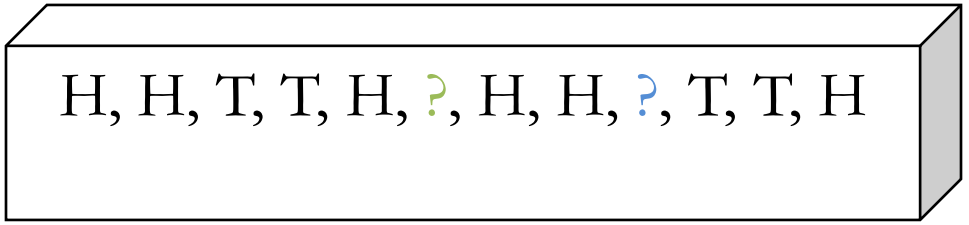


- Log Likelihood: log $P(D|\theta)$

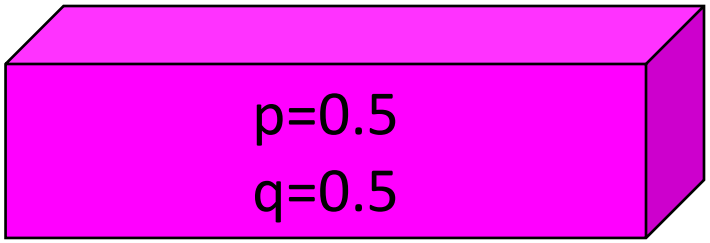
Example

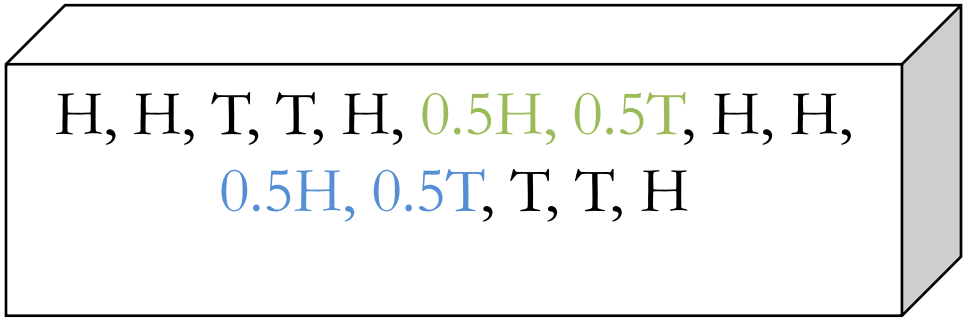
initial
guess



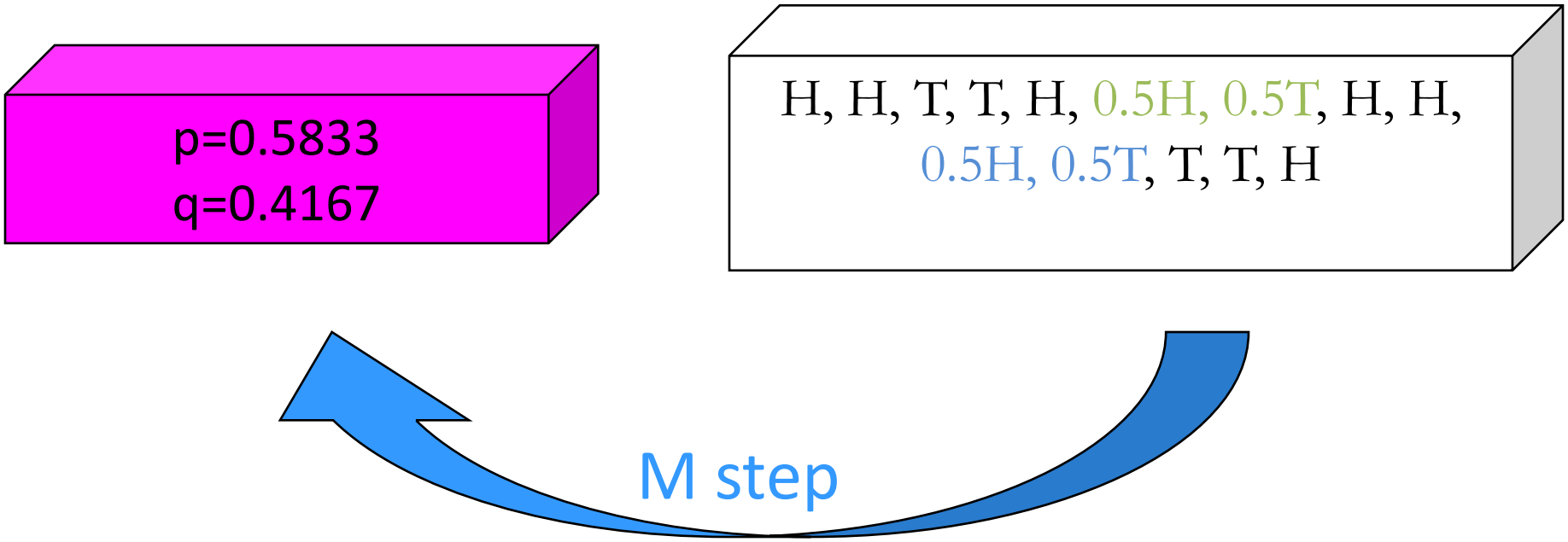


Example



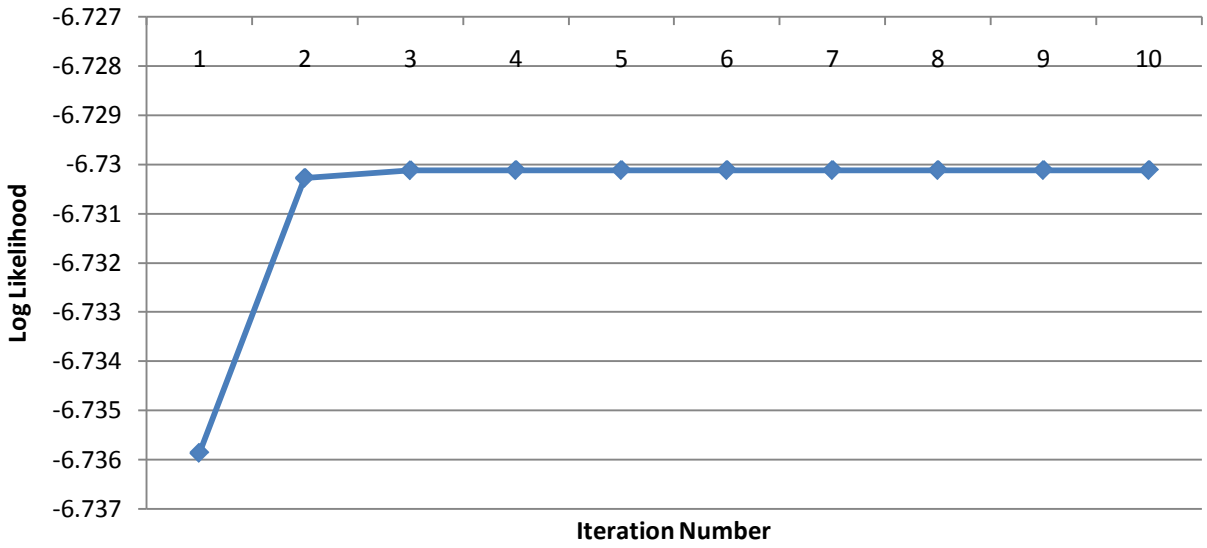


Example



Example (Contd..)

- Increase in Log Likelihood



- Likelihood is monotonically increasing .

  final parameter values,p = 0.6

  q = 0.4

  converges after 5 iterations.