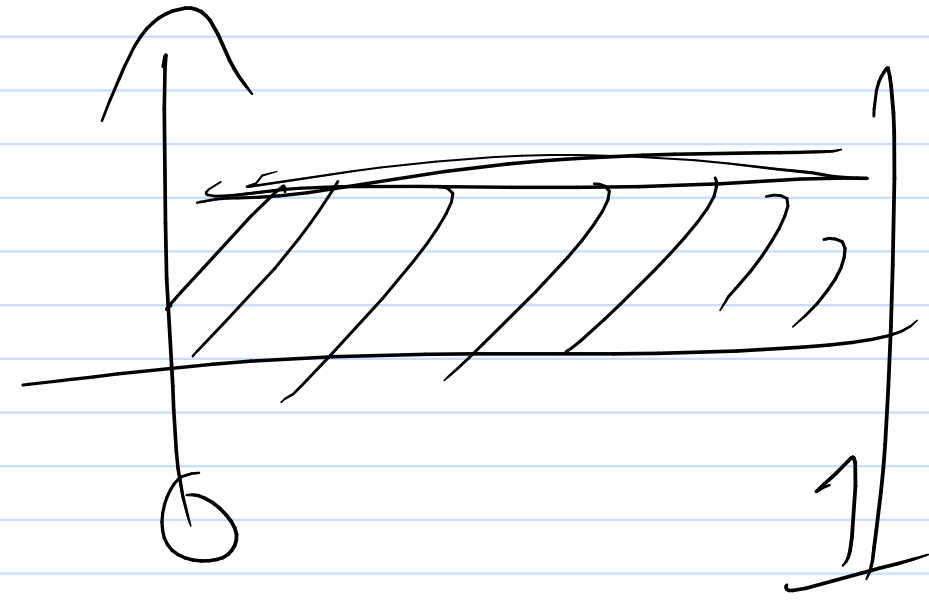


# Conjugacy

→ unif  $[0, 1] \equiv$  Beta  $(1, 1)$



Goal

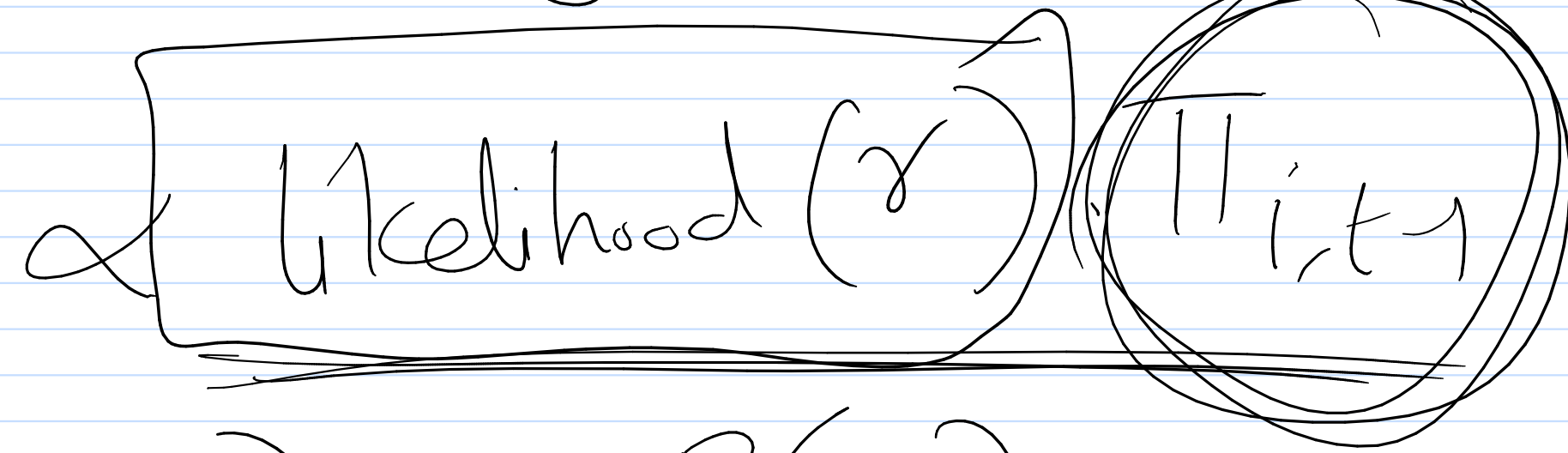
$$\pi_{i,t} \leftarrow \pi_{i,t-1}$$

$I_{t=i}$

$\gamma$  clicked or not

$\begin{cases} 1 \\ 0 \end{cases}$

$\pi_{i,t}$



$$\mu_i \sim \text{Beta}(\alpha_0, \beta_0)$$

$$\gamma \sim \text{Bernoulli}(\mu_i)$$

$$P(n_i | r=0) = P(r=0 | n_i) \cdot P(n_i)$$

Bernoulli
Beta( $\alpha_{old}, \beta_{old}$ )

Beta( $\alpha_{new}$ ,  $\beta_{new}$ )

$P(r=0)$

$$\left. \begin{aligned} \alpha_{new} &= \alpha_{old} \\ \beta_{new} &= \beta_{old} + 1 \end{aligned} \right\}$$