# Pragmatic issues, updating beliefs

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# 4.7 Pragmatic aspects

- Finite exchangeability
- Non parametric models
- Model elaboration/simplification
- Prior distributions

# 4.8 Discussion

- Parametric model can be shared between inviduals
  - Every invidual has his own prior
  - Some kind of common framework is necessary for any meaningful discussion
- Explanatory models vs. empirical models

# 5.1.1–5.1.3 Updating beliefs about parameters

- Predictive inference: $p(x_{N+1}|x_1, \ldots, x_N)$
- Parametric inference: $p(\theta|x_1, \ldots, x_N)$
- Beliefs about transformed parameters
- Nuisance parameters

# 5.1.4 Ancillary statistics and stopping rules

- A statistics $a(x)$ is ancillary if $p(a(x)|\theta) = p(a(x))$
- Likelihood principle: If prior $p(\theta)$ is known and two likelihoods are proportional as function of $\theta$, the posteriors are identical
  - Direct consequence of Bayes' rule
- Stopping rule gives stopping probability in sequential sampling
- If likelihood does not depend on $n$, stopping rules are "likelihood non-informative"
- Stopping rule can still affect the prior!

# 5.1.5 Inference summaries

- Point estimates
- Credible region
- Highest probability regions

# 5.1.6 Implementation issues

- Is analytic integration possible?
- Robustness against representation of prior beliefs
- Minimal prior information
- Approximating the integrals

# Exercise

Assume that you are selling your house. Every day a new offer $x_n$ comes in and you have a chance to accept the best offer so far. Living costs $c$ euros per day, thus your profit is $y(n) = max(x_1, \ldots, x_n) - nc$ if you sell after $n$ days. You belief that the offers are independent samples from $N(X|\mu, \sigma)$ with fixed $\mu$ and $\sigma$.

Which of the following stopping rules are proper, deterministic or likelihood non-informative?

- Sell after $K$ days when your living cost budget has run out
- Sell if $x_n$ is best so far and you win a round of rock-paper-scissors against the buyer
- Sell if average of the last ten offers is below $\mu$
- Sell if the profit is at least $\mu$

Does the situation change if the offers tend to get smaller when the time passes: $x_n \sim N(X|\mu \cdot \exp(-\alpha n), \sigma)$?