solutions to THI handed out next class, so ABSOLUTE last minute to turn it in is 104 on the 6 Mar

THI handed out Thu 6 Mar, due Fri of finals week

we need a makeup class (possibly two): survey

our data set

\[
\begin{pmatrix}
  y_1 \\
  y_2 \\
  \vdots \\
  y_n
\end{pmatrix}
\]

unknown parameter vector \( \theta \), we want to learn about this from \( y \)

\[
y = (y_1, \ldots, y_n)
\]

ex.

NB 10

\[
(\text{mor|10}) \sim p(\cdot|10) \; \text{iid} \quad \tau \sim t(\mu, \sigma^2)
\]

\( j = 1, \ldots, n \)

scaled \( t \)-dist

\[
\text{sample weight of NB10}
\]

\[
\begin{pmatrix}
  y_1 \\
  \vdots \\
  y_{100}
\end{pmatrix}
\]

\( L = 100 \)

\( \mu, \sigma^2 \)

\( \theta = (\mu, \sigma^2) \)
Compute \( p(\theta | y, B) = c \cdot p(\theta | B) \).

is,

\[ p(\mu_{\text{or} | y, B}) = \alpha p(\mu_{\text{or} | B}) \cdot c \cdot p(\theta | B). \]

Difficulties:
1. No conjugate prior exists here.
   \[ p(\mu_{\text{or} | y, B}) \]
2. It is a 3-dimensional prob. dist. difficult to visualize & work with.

Solution: Learn about (random-sampling) Monte Carlo methods.
identically distributed manner

\[ \frac{m}{n} \] if 181, 182, \ldots, 18n+1

\[ \frac{m}{n} \] each

\[ \frac{m}{n} \] in an \[ \frac{m}{n} \]
m.c data set

\[ \mu \rightarrow \nu \rightarrow \gamma_{n+1} \rightarrow \ldots \]

\[ \text{hist}(\mu_{\text{star}}) \]

\[ p(\mu | y, B) = \int \pi_p(\mu_{\text{prior}} | y, B) \, \text{d} \mu_{\text{prior}} \]

\[ E(\mu | y, B) = \text{sample mean of } \mu_{\text{star}} \]
\[ G(\theta^2) \approx p(\theta | \gamma) \]

- density mix of \( G \), \( g \)

- easy to sample from \( G \)

- \( \theta^* \)

- \( p(\theta | \gamma) \)

- target

- Beta density

- concave
IID (white noise) no time dependence

\[ \theta_k, \theta_{k+1}, \theta_{k+2}, \ldots \]

\[ \theta_k, \theta_{k+1} \]

\[ \theta_k = 0.5 \]

\[ \theta_{k+1} = 0.2 \]

\[ \theta_{k+2} = 0.1 \]

\[ \theta_{k+3} = 0.31 \]

\[ I(\theta_k, \theta_{k+1}) \]

\[ (\theta_k, \theta_{k+1}) \]

\[ (I_1, I_2) \]

\[ \text{log density} \]

by density

by conference

\[ \text{log likelihood} \]