Beamer Class Demonstration[1]

Me Myself

IQSS

September 27, 2017

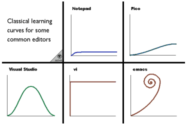
[1] Thanks to all the Beamer LaTeX people!

Overview

What's this course about?

- Specific statistical methods for many research problems
  - How to learn (or create) new methods
  - Inference:
    Using facts you know to learn about facts you don't know
- How to write a publishable scholarly paper
- All the practical tools of research — theory, applications, simulation, programming, word processing, plumbing, whatever is useful
- ⇝ Outline and class materials:

  j.mp/G2001

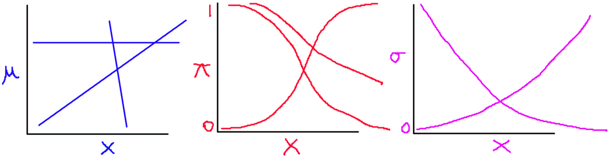
  - The syllabus gives topics, not a weekly plan.
  - We will go as fast as possible subject to everyone following along
  - We cover different amounts of material each week

How much math will you scare us with?

- All math requires two parts: proof and concepts & intuition
- Different classes emphasize:
  - Baby Stats: dumbed down proofs, vague intuition
  - Math Stats: rigorous mathematical proofs
  - Practical Stats: deep concepts and intuition, proofs when needed
    - Goal: how to do empirical research, in depth
    - Use rigorous statistical theory — when needed
    - Insure we understand the intuition — always
    - Always traverse from theoretical foundations to practical applications
    - Includes "how to" computation
    - $\rightsquigarrow$ Fewer proofs, more concepts, better practical knowledge
- Do you have the background for this class? A Test: What's this?

$$b = (X'X)^{-1}X'y$$

Systematic Components: Examples



- $E(Y_i) \equiv \mu_i = X_i\beta = \beta_0 + \beta_1 X_{1i} + \cdots + \beta_k X_{ki}$
- $\Pr(Y_i = 1) \equiv \pi_i = \frac{1}{1+e^{-x_i\beta}}$
- $V(Y_i) \equiv \sigma_i^2 = e^{x_i\beta}$
- Interpretation:
  - Each is a class of functional forms
  - Set β and it picks out one member of the class
  - β in each is an “effect parameter” vector, with different meaning

Negative Binomial Derivation

Recall:

one two three

this should be blue!

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&= \int_0^\infty \P(y, \lambda|\phi, \sigma^2) d\lambda \\
&= \frac{\Gamma\left(\frac{\phi}{\sigma^2 - 1} + y_i\right)}{y_i! \Gamma\left(\frac{\phi}{\sigma^2 - 1}\right)} \left(\frac{\sigma^2 - 1}{\sigma^2}\right)^{y_i} \left(\sigma^2\right)^{\frac{-\phi}{\sigma^2 - 1}}
\end{aligned}$$

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Structural Features

Levels of Structure

- usual LaTeX \section, \subsection commands
- ‘frame’ environments provide slides
- ‘block’ environments divide slides into logical sections
- ‘columns’ environments divide slides vertically (example later)
- overlays (à la prosper) change content of slides dynamically

Example (Overlay Alerts)

On the first overlay, this text is highlighted (or *alerted*).
On the second, this text is.

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```c
/* Say hello in C */
#include <stdio.h>
int main()
{
  char name[256];
  fgets(name, sizeof(name), stdin);
  printf("Hello %s", name);
  return(0);
}
```

Alerts

- First level alert
- Second level alert
- Third level alert
- Fourth level alert
- Fifth level alert

Other Features

Levels of Structure

- Clean, extensively customizable visual style
- Hyperlinks (click here)
- No weird scaling prosper
  - slides are 96 mm × 128 mm
  - text is 10-12pt on slide
  - slide itself magnified with Adobe Reader/xpdf/gv to fill screen
- pgf graphics framework easy to use
- include external JPEG/PNG/PDF figures
- output directly to pdf: no PostScript hurdles
- detailed User's Manual (with good presentation advice, too)

Theorems and Proofs

The proof uses *reductio ad absurdum.*

Theorem

There is no largest prime number.

Proof.

1. Suppose p were the largest prime number.

4. But $q + 1$ is greater than 1, thus divisible by some prime number not in the first p numbers. $\square$

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Blocks

Normal block

A set consists of elements.

Alert block

$2 = 2$.

Example block

The set $\{1, 2, 3, 5\}$ has four elements.