

Lab 12: L^AT_EX

Your Name (actually replace with your name)

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Directions

Your lab assignment today is to write the code to produce **this document (yes this one, the whole thing)** as well as a "README.md" which mimics this. You should end up with a second copy of this document at the end, but one that you compiled using L^AT_EX via the pdf_latex command.

1. First, write some "code" (hint: L^AT_EX is popular on stack overflow).
2. Then, compile it with pdf_latex.
3. Check the pdf to see if it looks right.
4. Rinse, repeat.
5. When you're done, submit your tex file and "README.md".

Text Formatting

Sometimes, you *may* want to emphasize some text.

Problem 0: Latent Dirichlet Allocation

Hey, can you help me with my homework? In Latent Dirichlet Allocation, we might need to use the equation for collapsed Gibbs sampling with equal document lengths N . (hint: math symbols can't be emphasized like text)

According to our model, the total probability is given as follows:

$$P(\mathbf{W}, \mathbf{Z}, \boldsymbol{\theta}, \boldsymbol{\varphi}, \alpha, \beta) = \prod_{i=1}^K P(\varphi_i; \beta) \prod_{j=1}^M P(\theta_j; \alpha) \prod_{t=1}^N P(Z_{j,t} | \theta_j) P(W_{j,t} | \varphi_{Z_{j,t}}) \quad (1)$$

After some fancy math on (1), integrating φ and θ out gives us

$$P(\mathbf{Z}, \mathbf{W}; \alpha, \beta) = \prod_{j=1}^M \frac{\Gamma(\sum_{i=1}^K \alpha_i) \prod_{i=1}^K \Gamma(n_{j,(\cdot)}^i + \alpha_i)}{\prod_{i=1}^K \Gamma(\alpha_i) \Gamma(\sum_{i=1}^K n_{j,(\cdot)}^i + \alpha_i)} \times \prod_{j=1}^M \frac{\Gamma(\sum_{r=1}^V \beta_r) \prod_{r=1}^V \Gamma(n_{(\cdot),r}^i + \beta_r)}{\prod_{r=1}^V \Gamma(\beta_r) \Gamma(\sum_{i=1}^V n_{(\cdot),r}^i + \beta_r)} \quad (2)$$

Now we can work with that!



Problem 1: Let's Learn Markdown!

Make your git page's README.md to mimic this paper. HINT: you can embed latex equations into your markdown. You could use Pandoc, but don't because that's cheating. To keep it simple, I'd recommend turning your equations into images.