Template Tex-File

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1 This is a template

This template is meant as a resource for you to type up your problem set solutions. I added a couple of useful latex commands that hopefully serve as a good introduction into how to use latex.

There are multiple (free) programs you can download in order to write a latex file. I use TeXstudio. Another great program is Overleaf, which stores your texfiles online and allows you to collaborate with multiple people. It also offers command suggestions when writing, which can be particularly helpful at the beginning. Some people prefer LyX, which offers an easier writing environment. In oder to use this template, I recommend opening both the tex.file (in the Latex or LyX editor) and comparing the commands with the pdf version.

You start the latex file by loading in packages (see above). If you would like to use additional functions, such as math modes, you will need to add the corresponding packages.

If you want to comment out a line, use the %.

2 Section with Numbering

Subsection without Numbering

There are different ways for how to write section headers, either including numbers or not.

3 Mathematical Expression

See below for how to enumerate using *enumerate* or simply list items with *itemize*.

Following mathematical expression are covered in the rest of this template:

1. Matrix
2. Inverse

3. Distribution
4. Underscores and bold letters
5. Fractions
6. Equations
7. Derivatives
8. Conditional expectations
9. Greek letters

Matrix

This is how you write a matrix in Latex:

$$\Sigma = \begin{bmatrix} \Sigma_{11} & \Sigma_{12} \\ \Sigma_{21} & \Sigma_{22} \end{bmatrix}$$

Inverse

This is how you write an inverse:

$$\Sigma^{-1}$$

Distribution

This is how you write a distribution: $\mathbf{Z} \sim N\Big(\mu, \Sigma\Big)$

Bold letters

This is how you write underscores / bold letters: $f_{\mathbf{Y}}(\mathbf{y})$

Fractions

This is how you write fractions: $\frac{1}{2}$

Equations

This is how you write an equation over multiple lines using *align*:

$$\begin{aligned} 8 &= 5 + 3 \\ &= 10 - 2 \\ &= 8 \end{aligned}$$

Derivatives

If you would like to use mathematical expressions without the align environment, make sure to use the dollar signs around the expression. Here is an example using *partial* to type a derivative: $\frac{\partial x}{\partial y}$.
If you would like to center the expression, use double dollar signs:

$$\frac{\partial x}{\partial x}$$

Conditional Expectations

This is how you write conditional expectations: $E[Y|X]$

Greek letters

You probably will use α and β a lot. You can also use underscores here, for example if you are looking for β_0. If you are looking for an estimator or fitted value, here is the hat command: $\hat{\theta}$.