Introduction to LaTeX

Math 3140 Class

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1   Introduction

To write paragraphs, I just start typing away. Now, spacing gets done automatically, so for example, this space not be noticed in the output. To start a new paragraph, I just need to skip two lines.

Here is the new paragraph, coming after two carriage returns.

2   Preliminaries

There are a variety of ways to do math. If you want to put math in line, you just surround it with dollar signs. For example, a text b looks like that, but a math b looks like that. The other option is to display math so, which is done by double dollar signs. For example,

$$\sum_{k=1}^{n} k = \binom{n}{2}.$$

As we see, subscripts are done with a_2, and exponentials are done by carrots, so a^{x^2-1}. The use of curly brackets is important since underscore and carrot only take the symbol immediately following otherwise. For example,

$$x^2 1 \qquad \text{vs.} \qquad x^{21}.$$

3   Main results

One of the great strengths of LaTeX is its ability to cross-reference and make statements like theorems look nice. For example,

Theorem 3.1 (Cayley's Theorem)**.** *Let G be a finite group with n elements. Then G is isomorphic to a subgroup of S_n.*

Proof. Here is where I would prove Cayley's theorem. Alternatively, one can look at [1] for a proof. □

Suppose I want to refer to Theorem 3.1.

Remark. Note that Cayley's Theorem does not always give the most efficient way to view G as a subgroup of some symmetric group. For example, $A_n \subseteq S_n$, but Theorem 3.1 suggests

$$A_n \subseteq S_{|A_n|} = S_{\frac{n!}{2}}.$$

Question. What is the smallest n such that G isomorphic to a subgroup of S_n?

3.1 Miscellaneous thoughts

Certain symbols are reserved for coding, so if you actually want the symbol you need to do something additional. For example, \ or $.

To do matrices, we write

$$\begin{bmatrix} 1 & 2 & x^3 \\ 4 & 0 & e^\pi \\ 5 & \alpha - \beta & -1 \end{bmatrix}.$$

Cycles are easy, since I can just write $(1,4,6)(2,3,5) \in S_6$. Here is Δ versus δ. Also, $\cap$ versus $\cup$.

References

[1] Armstrong.