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Making a Poster in LaTeX

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Introduction

- This file is a template for a 30x40 poster using textblocks [1].
- Each section is a textblock
- Each textblock has its own size so you can have sections that span multiple columns or start each section at a different height [2].

A Section

Inline lists save space, useful for posters: • The first point starts right next to the previous text • The next point follows on the same line • And so on...
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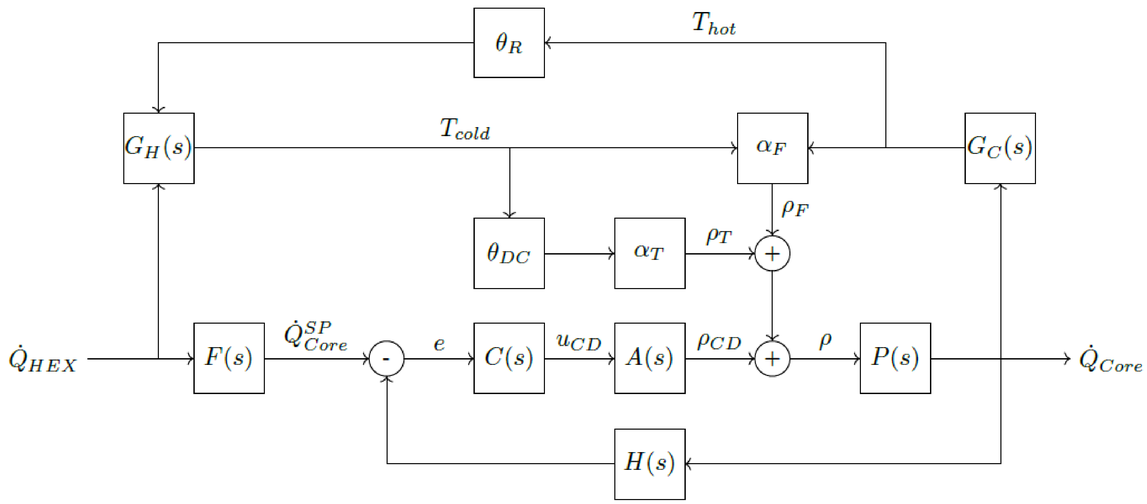
Try to avoid big blocks of text that are used for the template. Use a lot of:

- Figures
- Tables
- Lists
- Equations

to convey your point in a more visually appealing manner. Consider whether you are presenting the poster, where you can help fill in some context, or if the poster will just be left up and you will need to convey every takeaway in what is printed out.

A Large Section with a Large Figure



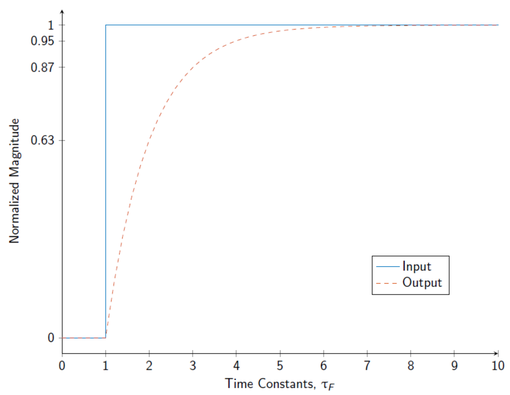
This is a very large figure. I chose to put it at the top, right under the title, as it was the key aspect of my poster and I wanted attention drawn to it. You can change the sizes and arrangements of the textblocks to achieve a different look, or just slightly modify the size of the blocks to fit your content. Try to avoid having any text go too close to the edge or it could get cut off when printed.

Pre-Filter

$$F(s) = \frac{1}{\tau_F s + 1}$$

Pre-filters are unity gain transfer functions that provide inertia against rapid changes. A pre-filter that reshapes the set-point after a change to an independent variable. It follows and exponential curve defined by the time constant.

- 63.2% after one time constant
- 86.5% after two time constants
- 95.0% after three time constants



Dead-band

- Type of piecewise function where the output is null for inputs surrounding zero ($\pm\delta$) but has some other value for inputs with greater magnitude.
- Common in thermostatic controls (where the furnace in a home only turns on when the temperature inside is sufficiently far from the setpoint).

$$K_C = \begin{cases} K_C & \text{if } e < -\delta \\ 0 & \text{if } -\delta < e < \delta \\ K_C & \text{if } e > \delta \end{cases}$$

Previous work [2] showed that: • Conclusion 1; and • Conclusion 2;

And this is how that can be applied...

PID Controller

The controller output (u) is often determined by a PID equation, which considers the instantaneous, cumulative, and predictive error. This equation has three terms:

1. Proportional control term. The control output is manipulated in proportion to the error defined by the proportional gain constant (K_P).
2. Integral control term, which considers the historical cumulative error in an effort to eliminate steady-state offset that a P-Only controller may exhibit. As the process variable settles around the set-point, the cumulative error approaches a constant value and the effect of the integral controller diminishes.
3. Derivative control term, which estimates the time rate of change of the error to dampen overshoot. This mechanism is sometimes referred to as anticipatory control.

Be sure to rearrange your textblocks to avoid large gaps like the one below

$$u(t) = \underbrace{K_P e(t)}_{\text{Proportional}} + \underbrace{K_I \int_0^t e(t)dt}_{\text{Integral}} + \underbrace{K_D \frac{de(t)}{dt}}_{\text{Derivative}}$$

Future Work

- A poster is usually used to present a work in progress or provide a glimse into a larger project
- You will usually have some future work associated, or some larger context that this fits into
- It is a good idea to talk about some of this to help a ready think about the broader applications
- Be sure to update your acknowledgments as well as title/author/email/etc. [1]

References

[1] Root, Sam J., 2024 5. Dynamic System Modeling and PID Controller Design for a Molten Salt Microreactor. Master's thesis, University of Idaho.

[2] Vandal, Joe, Author, Second, Author, Third, Author, Last, 2023. A paper that is also a thesis chapter. Journal of Idaho 100, 123456. ISSN 0029-9876. doi: 10.1016/j.nucengdes.2023.123456.

Acknowledgments: This work and my coursework in pursuit of an M.S. in Nuclear Engineering is being completed under a Graduate Fellowship funded by Nuclear Regulatory Commission