Title of my ECE/CS584 class project on an interesting problem

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Abstract

Write an abstract.

1 Introduction

Start with a succinct motivation for the problem. You can assume the reader to be a graduate of this class.

Describe the problem.

State the contributions. Perhaps as an itemized list, if that's your style:

- We formulated a new problem ...
- We show that ....
- We implemented .... and demonstrated its effectiveness in...

Speaking of style, you can make text **bold**, *italicized*, underlined, and even colored. You can change the font to this, `this`,or *this*, among many others. But, these are distracting for the reader and avoid them unless you know exactly what you are doing.

Briefly reflect on the impact of the work and possible future direction.

Describe the organization of the rest of the paper. In Section 2 we present a discussion of the related work in timed automata and syntax-guided synthesis. In Section 4 we present a formal model of the system. And so on.

2 Related work

Here is a nice paper [2] by some people I know. If there are several lines of related works, it is always a good idea to split them into paragraphs like these:

Timed automata Some astute observations about related work on timed automata [1]. Works best if the existing work is contrasted with the proposed approaches and results.

Syntax-guided synthesis Here is some related work on synthesis.

3 Preliminaries and Problem Formulation

This is the section where you start the mathematical development. Introduce basic notations. Many are defined for you in the prelude1.tex file. For example, $\mathbb{R}$, $\mathbb{N}$, $\mathbb{R}_{\geq 0}$.

You can use definitions, propositions in special environments that make them easier to read and refer to. For example,

Definition 1. *A positive definite function* $V : \mathbb{R}^n \to \mathbb{R}$ *is a* Lyapunov function *iff* ....

We shall use the following well-known result from [1].

Theorem 1. *A positive definite function* $V : \mathbb{R}^n \to \mathbb{R}$ *is a* Lyapunov function *iff* ....

At some point arrive at a precise problem statement. For less mathematical papers, you may not need that many definitions and symbols, but still there should be a clear problem statement.

```
automaton RimlessWheel(α, μ : Real, n : Nat)
  const β : Real := 2π/n;
  types Spokes : enumeration [1,...,n];
  signature
    internal impact;

  variables
    internal θ : Real := 0;
      ω : Real := 0;
      pivot : Spokes := 1;

  transitions
    internal impact
      pre θ ≥ β/2
      eff pivot := pivot + 1  mod n;
        θ := −β/2;
        ω := μω;

  trajectories
    mode swing
      d(θ) = ω;
      d(ω) = sin(θ + α);
      invariant θ ≤ β/2
```

Figure 1: HIOA model of rimless wheel.

4 System Model

You may have a section where you present a new system model. There are many different ways of showing specifications using the IOAlanguage style defined in prelude1.tex. You can even write your own language styles in LaTeX. Here is just one example shown for you in Figure 3.

5 A Section on Algorithms

6 A Section on Analysis

7 A Section on Implementation, testbed, and design

8 Experimental Results

Figure 8 is an interesting figure. You can embed pdf, jpg, and other types of figures directly. There are many different ways of formatting and placing figures in a LaTeXdocument. Try, for example, the versatile wrapfigure package if you are running out of space. Beware, the position of figures is determined by the LaTeXcompiler, often with surprising results.

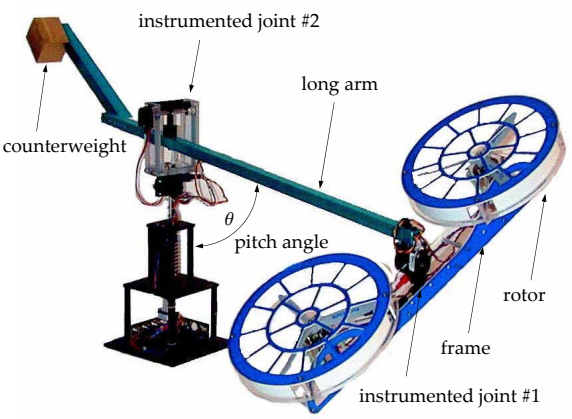

Figure 2: A picture of the desktop helicopter testbed.

9 Conclusions

What was done? How did it advance the state of the art or the state of our knowledge? Why was it interesting?

What are the future directions?

References

[1] Rajeev Alur and David L. Dill. A theory of timed automata. *Theoretical Computer Science*, 126:183–235, 1994.

[2] Chuchu Fan, Bolun Qi, Sayan Mitra, and Mahesh Viswanathan. DryVR: Data-driven verification and compositional reasoning for automotive systems. In *Proc. 19th Int. Conf. Computer Aided, CAV, Part I*, pages 441–461, 2017.