



DESIGN AND FABRICATION OF EXPERIMENTS FOR AUTOMATED SYSTEM IDENTIFICATION

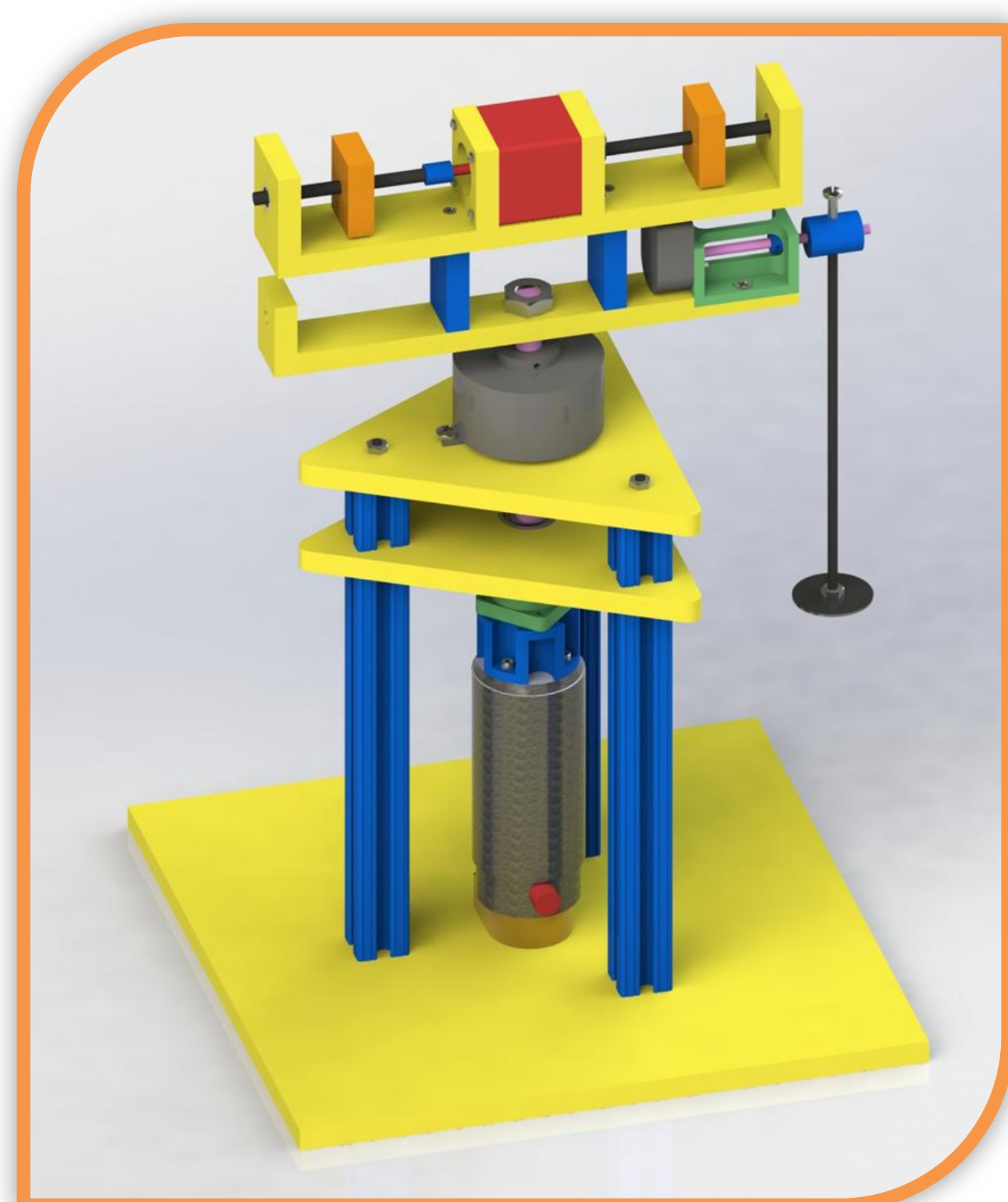
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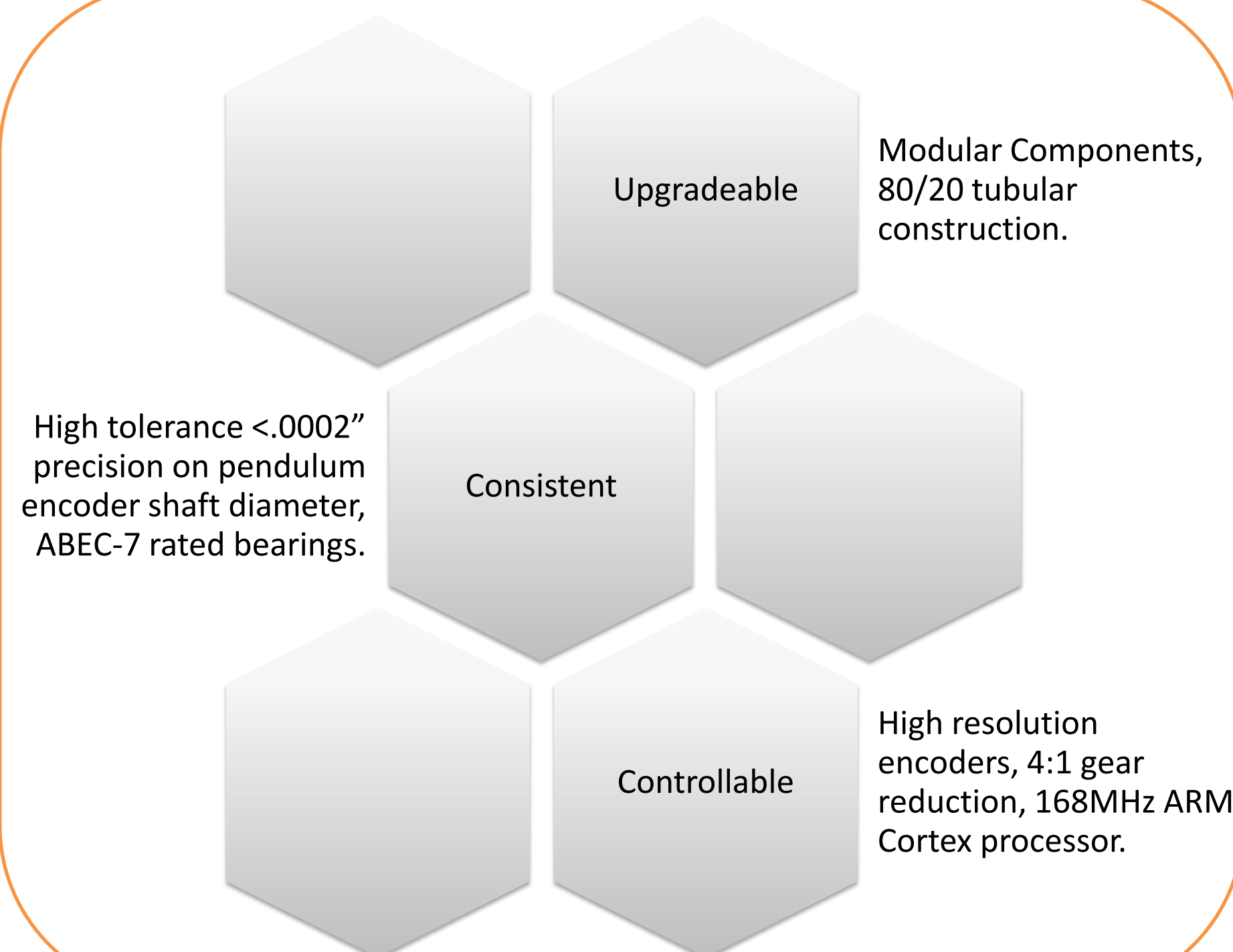


Objectives

Design and fabricate multiple experimentation platforms capable of testing the implementation of time varying automated system identification algorithms.



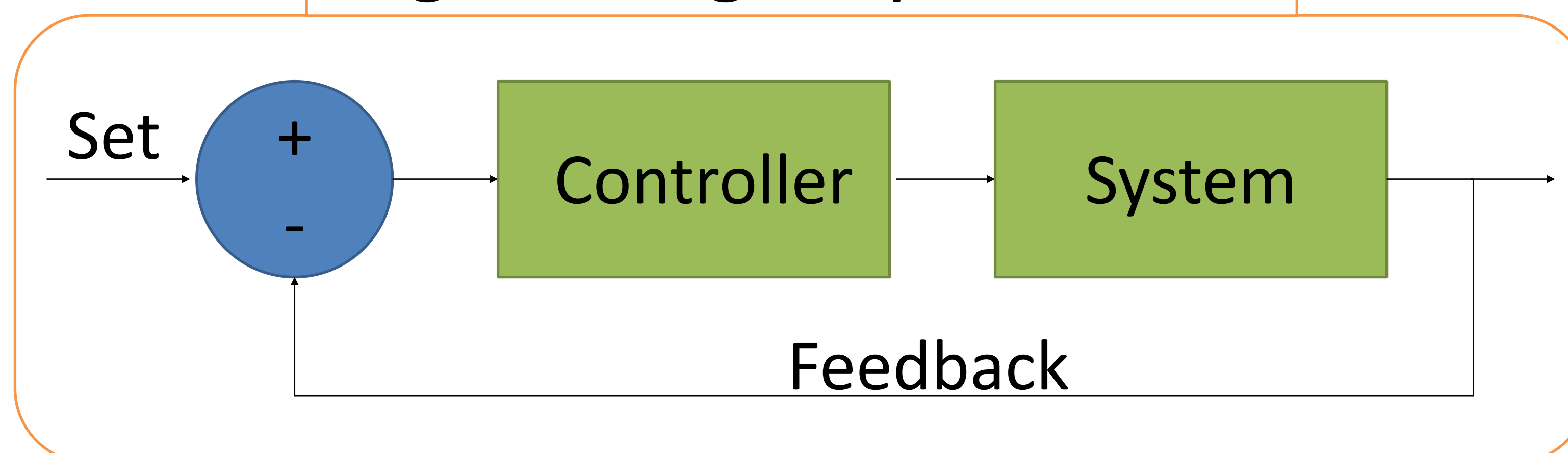
Engineering Requirements



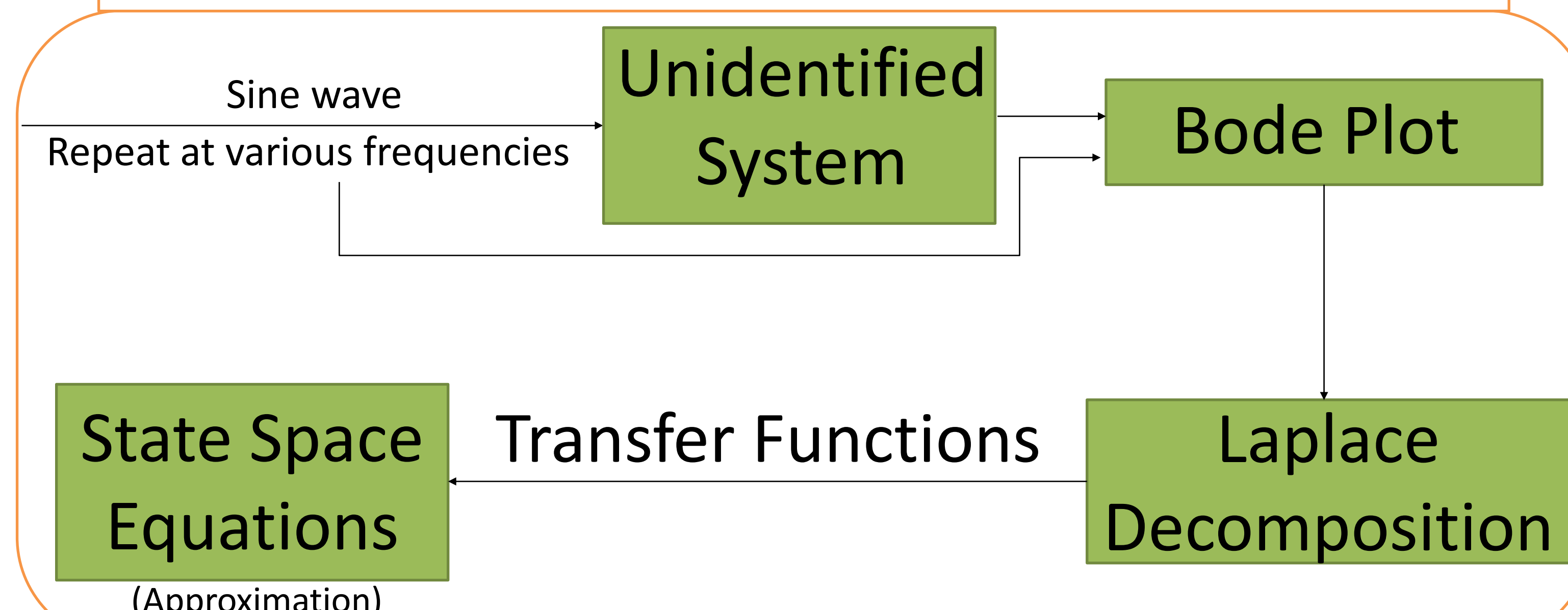
Abstract

An accurate system identification (SYSID) is crucial to understanding and controlling systems. Unfortunately, to understand the dynamics of a plant, one must take the system to its limits. Pioneering non-linear, time varying automated system identification requires simple systems to be created that can be altered and extended to their limits without permanently damaging or altering the dynamics of their behavior. To meet this requirement, a second generation coaxial rotational pendulum is being designed and built. After construction, data will be collected to verify that the system is ready for research.

Engineering Requirements



A Linear System Identification Process



Evaluation Parameters

Tolerance Analysis	Mechanical Analysis	Electrical Analysis
<ul style="list-style-type: none"> Solidworks Clearance Verification Manual Tolerance Analysis 	<ul style="list-style-type: none"> Solidworks Stress analysis Verify Velocity Consistency 	<ul style="list-style-type: none"> Slip Ring Noise

Expected Results

Production of a time-varying system with well understood dynamics.

Conclusion

Even though a pendulum has not been completed yet, a full system has been made and is ready. Several roadblocks still remain for construction in the form of machine certification, fabrication of the system will proceed as time permits.

Future Work

- Magnetic levitation
- Actual pendulum on cart
- Double pendulum



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