June 03, 2016 Control System Description

Introduction

Voltage corrections are made until the target Acceleration is reached

The acceleration is precise, but not accurate

System can mimic an acceleration, when the lid is attached or removed

More calibration will be performed eventually to make it accurate

Capabilities (**control Mode**)

1. Tuning acceleration to a target value

Allows acceleration to be consistent between trials

e.g. The arrays and droplet launcher have increased in weight

The acceleration will be corrected to be the same as before

This response occurs passively

1. Increase voltage when lid is attached

Allows acceleration to be maintained when lid is attached

e.g. The lid is being screwed on

The additional mass drops the acceleration to 2/3 of the target value

The voltage will be adjusted automatically

Acceleration will return to the target value

This response occurs in ~0.25 seconds Exact time to be determined

(Average, and worse case)

1. Drop voltage when lid is partially attached

**This is a failsafe**, to prevent any violent shaking from damaging the system

**It is still preferred to manually lower the voltage when removing Lid**

**Because there is a short delay between lid unscrewing and correction**

**Close program**

**Turn down function generator or power amplifier**

**Remove Lid**

e.g. One wing nut on the lid has been removed, leaving just one

The un-tightened side bounces up and down (this is bad)

The voltage is dropped to a safe level (currently 600mV)

The shaking is no longer at dangerous levels

This response occurs in ~0.25 seconds Exact time to be determined

1. Drop voltage when lid is attached

Allows acceleration to be maintained when lid is removed

e.g. The lid is being screwed off.

The lowered mass raises the acceleration to 3/2 of the target value

(VERY BAD, this is why should lower voltage before remove!)

The voltage will be adjusted automatically

Acceleration will return to the target value

This response occurs in ~0.25 seconds Exact time to be determined