Oscillator Control Diagram (Detailed

**+**

**-**

Σ

Disturbances

(g)

Target

Peak-Accel

(g)

Osci-Accel

(g)

Osci-Force

(g)

Driving

Peak-Volt

(V)

Next

Peak-Volt

(Vpp)

Limited

Peak-Volt

(Vpp)

Error

Peak-Accel

(g)

Error

Peak-Volt

(Vpp)

Tray-Accel

(g)

**+**

MatLab Control

Dif Eq

Accel-to-Volt

Constant

Kv

(FG &)

Power

Amplifier

Kp

Limiter

**+**

Oscillator

Characteristics

Ko

Tray Mass

1/Km

**Σ**

Peak-Accel

(g)

Raw

Peak-Accel

+noise

(?)

Raw

Tray-Accel

+noise

(?)

Peak-Accel

(g)

Peak-Accel

+noise

(g)

Tray-Accel

(g)

Normalize

1/Ka

Accelerometer

Peak Detection

Noise Filter

Accelerometer

Ka

Control Dif Eq

Gives Accel Correction

dV = - (Atarget – A) = - AccelError

Later become more complex?

Such as square of error, exponent of error

Linear combinations

Will use to Simulink to find optimal equation

Accel to Voltage Amplitude

Reverse of Power amplifier and Oscillator Characteristics

Input = NewAcceleration

Output = NewVoltage

NewVoltage = NewAcceleration \* Km/ (Kp \* Ko)

Because PeakAccel = FGVoltage \* Kp \* Ko / Km

Power Amplifier

Output = Input \* Kp

Kp = approximately 10

Will fine tune / fine measure later

Oscillator Characteristics

Input = PeakVoltage from Power Amplifier

Output = PeakForce

PeakForce = Ko \* PeakVoltage

PeakVoltage = Output of Power Amplifier

Tray Characteristics

Input = PeakForce

Output = PeakAccel

PeakAccel = PeakForce / Km

Km = Mass Tray

This is a variable because

Lids

Arrays

Oil

Program with lower/upper bounds

Later:

Program to detect the mass

Accelerometer Peak Detection

Normalize

Noise Filter