Hover

Active Suspension System
Transportation & Shipping

- 1 in 10 packages damaged during shipping
- Local specialized freight trucking (incl. Fragile goods): $42.6 Billion
- Fragile Goods: Glass, Liquids, Sensitive Electronics, Antiques, Food

**Need:** Small scale active suspension
Existing Technologies

Packaging

Newspaper

“Bubble wrap”

Foam packing peanuts

Self-Balancing and Shock Absorbing

Self-Balancing Shipping Packaging

Newspaper

“Bubble wrap”

Foam packing peanuts
Potential Mechanisms

- Rotating Linkages
- Linear Actuators
- Gyroscope
Key Questions

1. Feedback control implementation?
2. Issues with a system of rotating linkages?
3. Speed, accuracy, and power consumption?
Sketch Model

- Platform
- Rotating Linkage
- Servo Motor
- Accelerometer

Prototype | Results | Next
Results

Progress:

- Successfully control height of platform end using feedback control
- System reacts quickly on small scale

Challenges:

- Potential problems with singularities in rotating linkage
- Emphasized need for active damping
- Larger moments of inertia increase energy consumption
Next Steps

- Stronger motors, more power, better materials
- Increased degrees of freedom and range of motion
- Addition of active damping of vibrations