



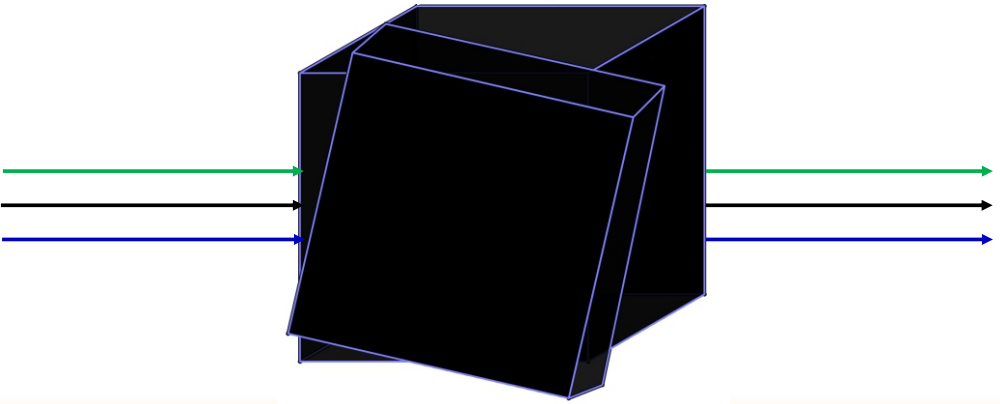
# Mechanical Expressions

Break Open the Black Box

$$\frac{\frac{g(\theta \cos \alpha - \alpha) \cos \theta}{(\theta) \sin^2 \alpha} + \frac{g(\theta \cos \alpha - \alpha) \sin \theta}{(\theta) \sin^2 \alpha}}{\frac{g(\theta \cos \alpha - \alpha) \cos \theta}{(\theta) \sin^2 \alpha} + \frac{g(\theta \cos \alpha - \alpha) \sin \theta}{(\theta) \sin^2 \alpha}} \Rightarrow \alpha$$

$$z_0 \Rightarrow \frac{-g \cdot (-a \cdot m + M \cdot x) \cdot \cos(\theta)}{-a^2 \cdot m \cdot M \cdot x^2}$$

$$= \frac{g \cdot m \cdot r \cdot \sin(\gamma)}{-2 \cdot m \cdot r^2 + 2 \cdot m \cdot r^2 \cdot \cos(\gamma)} + \frac{m \cdot r^2 \cdot y^2 \cdot \sin(\gamma)}{-2 \cdot m \cdot r^2 + 2 \cdot m \cdot r^2 \cdot \cos(\gamma)}$$



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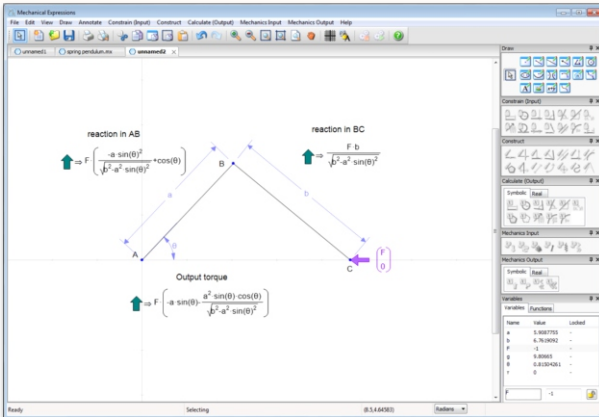


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# Mechanical Expressions

## Break Open the Black Box



### Explore Models

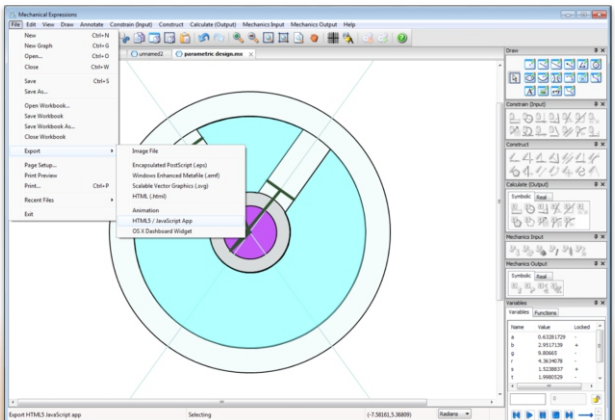
- Statics
- Dynamics
- Inverse Dynamics
- Kinematics
- Geometric Modeling

### Create Models

- Make a sketch
- Add Constraints
- Apply velocities, masses and force elements
- Extract output expressions for velocities, acceleration and forces

### Share Models

- Copy expressions to and from CAS systems like *Mathematica* or *Maple*
- Send output as Tex, MathML
- Or as computer source code in:
  - C
  - C++
  - C#
  - VB
  - VBA
  - Java
  - JavaScript
  - ActionScript
  - Lua
- Display an interactive Dynamic Simulation as a browser app or dashboard Widget



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