图片包含 设备, 量规

描述已自动生成

**f**

**D**

**T3**

**T1**

Torque equilibrium equation:

Setting , when ,,.

The mass of the pendulum: 0.853kg

The radius of the rod: 1.2cm, 0.012m

Then length of the pendulum: 0.52m

The density of the rod: 6939 kg/m^3

The mass of the rod: 0.095kg, length = 0.4m

<https://c-motion.com/v3dwiki/index.php/Segment_Inertia>

Moment if inertia (cone):

Moment if inertia (cylinder):

Moment if inertia (rod):

Moment if inertia (top):

Moment if inertia (pendulum):

**Force of Propeller:**

<https://m-selig.ae.illinois.edu/props/propDB.html>

Drag Force:

Velocity of Propeller:

<https://www.micromo.com/technical-library/dc-motor-tutorials/motor-calculations>

<https://en.wikipedia.org/wiki/Motor_constants#Motor_velocity_constant,_back_EMF_constant>

Total thrust force of one propeller:

Net Force:

**Table of Parameters:**

|  |  |  |  |
| --- | --- | --- | --- |
| Symbol | Definition | Symbol | Definition |
|  | angle (rad) between pendulum and y axis upward |  | angle (rad) between pendulum and y axis downward |
|  | Disturbance from the cart |  | Mass of pendulum |
|  | Trust force from the right propeller |  | Trust force from the left propeller |
|  | direction of the rotation |  | Distance from the origin to the mass center of the pendulum |
|  | Gravity |  | Friction disturbance (such as air) |
|  | Moment of inertial of the pendulum |  | length of the pendulum |
|  | Radius of propeller |  | Drag coefficient of propeller |
|  | Zero lift drag |  | Lift coefficient of propeller |
|  | Aspect Ratio |  | Span efficiency factor |
|  | Velocity of one propeller |  | Drag force of propeller |
|  | Resistance of propeller motor |  | Propeller motor back emf constant |
|  | Propeller motor torque constant |  | Propeller motor friction current |
|  | Voltage of propeller velocity |  | Command of Propeller |
|  | Max propeller command |  | Distance from the top center to the propeller center |
|  | Angular velocity of pendulum about x axis |  | Angular velocity of pendulum about y axis |
|  | Disturbance inputs of |  | Disturbance inputs of |