Model Documentation of the:

Heisenberg Flywheel

1 Nomenclature

1.1 Nomenclature for Model Equations

$x,$	Position of the mass
θ	angle
I	moment of inertia of the flywheel
m	mass
τ	torque
v	velocity of mass along the rod

2 Model Equations

$$\dot{x} = \tau \tag{1a}$$

$$\dot{y} = v \tag{1b}$$

$$\dot{\theta} = \alpha y \tau - \alpha x v \tag{1c}$$

with $\alpha = -\frac{I}{m}$
Inputs: $v,\ \tau$
Parameters: m

2.1 Assumptions

1. Mass m is a pointmass

2. rod, which connecting m to the flywheel is massless

3. joint, which connects the flywheel to the table is frictionless and doesn't exert torque on the system

References

[1] Bagagiolo, F.; Zopello, M.: *Hysteresis and Controllability of affine driftless systems: some case studies*, p. 10, mmnp-journal 2020