Autonomous Vehicle Simulation (AVS) Laboratory, University of Colorado

Basilisk Technical Memorandum
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MODULE TO APPLY A CYCLIC PULSED DISTURBANCE TORQUE

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Status: First Version
Scope/Contents
This module allows the user to setup a cyclic pulsed external disturbance torque. The pulses are symmetrically applying $\pm\boldsymbol{\tau}_{pulsed}$ followed by a specified off period before repeating.

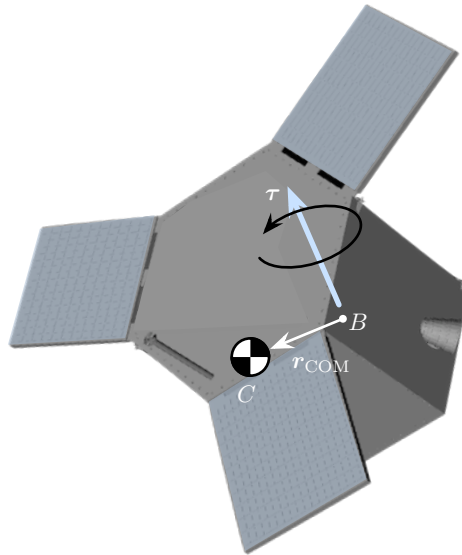| Rev:	Change Description	By
v1.0	Initial document	H. Schaub

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Fig. 1: Illustration of Disturbance Torque acting on a rigid body

1 Introduction

This module allows a special pulsed external disturbance torque τ to be applied onto a rigid body. The torque is taken about the body-fixed point B, and the vector components are given in the body frame $\mathcal{B}$ as illustrated in Figure **??**.

2 Specifying the Pulsed Disturbance Torque

The module creates a cyclic disturbance torque which is applied to the rigid body. The torque vector τ is applied for equal time periods as $+\tau$ and $-\tau$. This is followed by a specified off period before repeating. This pattern is illustrated in Figure 2.
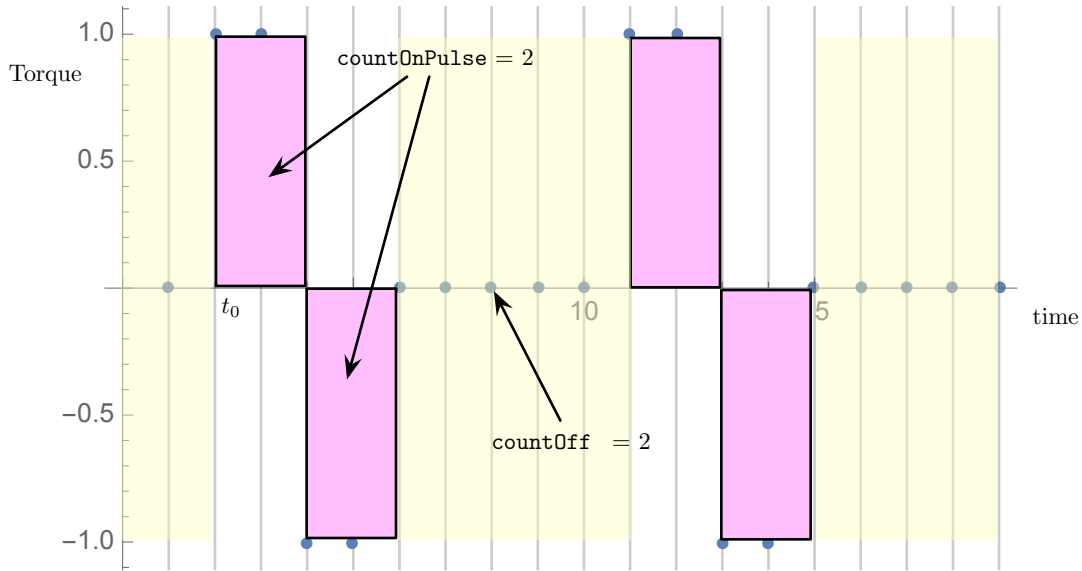
Fig. 2: Illustration of Pulsed Disturbance Torque

Note that the pulse and off periods are specified through integer counts of the simulation integration time.

3   Module Parameters

The external disturbance torque vector and pulsing parameters are set directly from python.

3.1   `pulsedTorqueExternalPntB_B` **Parameter**

This vector sets the external torque, about point B, in $\mathcal{B}$ body-frame vector components.

3.2   `countOnPulse` **Parameter**

This integer represents the duration of both the $+\tau$ and $-\tau$ pulses. The integer value represents how many integration time steps the pulse is on.

3.3   `countOff` **Parameter**

This integer represents the off period duration between $\pm$ pulsing. The integer value represents how many integration time steps the pulse is off.