Autonomous Vehicle Simulation (AVS) Laboratory, University of Colorado

Basilisk Technical Memorandum

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MODULE TO APPLY A CYCLIC PULSED DISTURBANCE TORQUE

Prepared by	H. Schaub

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

Contents

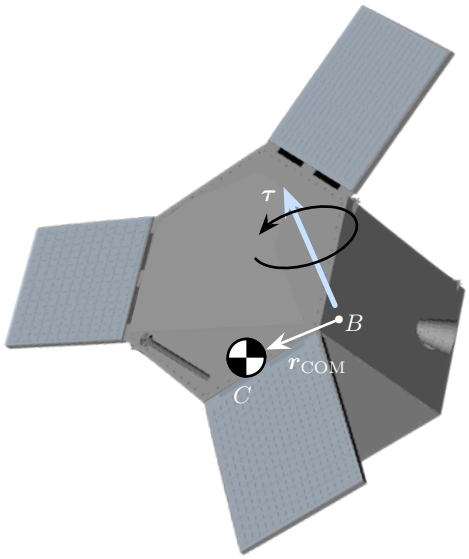

Fig. 1: Illustration of Disturbance Torque acting on a rigid body

1 Introduction

This module allows a special pulsed external disturbance torque $\boldsymbol{\tau}$ 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 1.

2 Specifying the Pulsed Disturbance Torque

The module creates a cyclic disturbance torque which is applied to the rigid body. The torque vector $\boldsymbol{\tau}$ is applied for equal time periods as $+\boldsymbol{\tau}$ and $-\boldsymbol{\tau}$. This is followed by a specified off period before repeating. This pattern is illustrated in Figure 2.

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

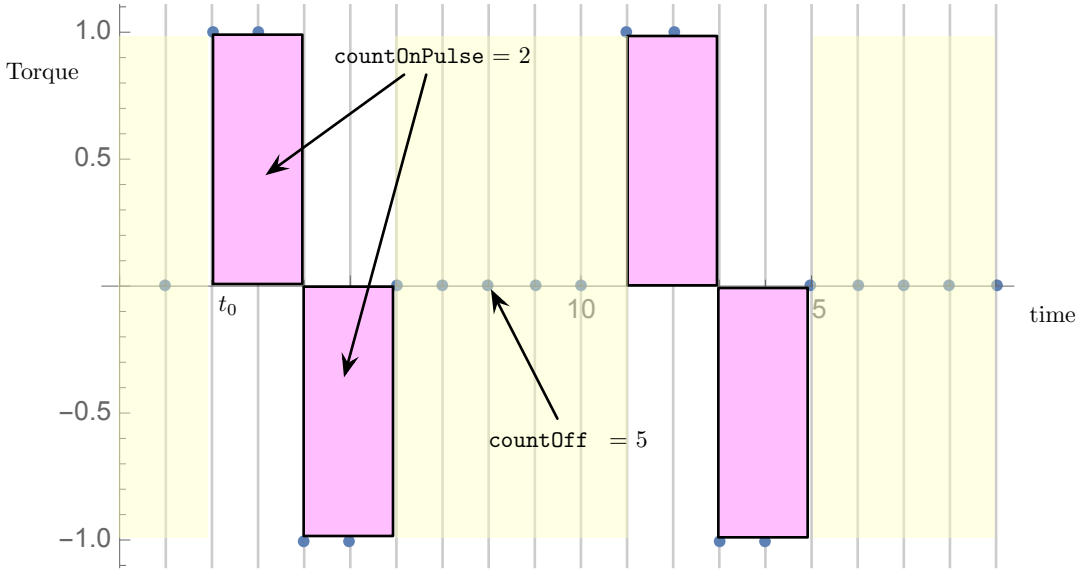

Fig. 2: Illustration of Pulsed Disturbance Torque

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 $+\boldsymbol{\tau}$ and $-\boldsymbol{\tau}$ 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.