

6DOF Stewart Platform Control Library

User Manual



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1. Introduction

1.1. Definitions and Acronyms

6DOF – six degrees of freedom

1.2. Overview

Stewart Platform is a mechanism with 6 degrees of freedom, which enables the motion platform to move in three directions and rotate around three axes.

1.3. Purpose

The purpose of this toolkit is to implement the kinematical computations in order to control the real system or to use it in simulation purposes.

1.4. Scope

There are two main mechanical principles for this purpose: the linear actuators and the servo motors. 6DOF Stewart Platform control library implements the inverse kinematics for both of them.

2. Palette

The library palette is located in the *Functions->Addons->Ovak Technologies* category. It consists of two VIs. The operation of these VIs is described in the example section.

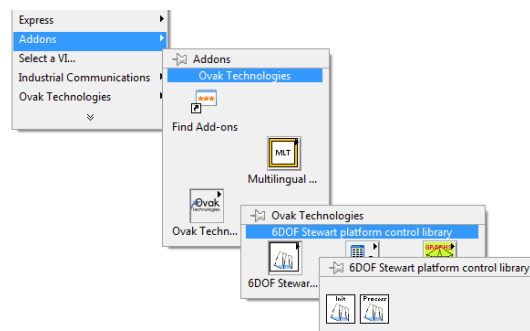


Figure 1 Toolkit Palette

3. Example

The example describes the operation of 6DOF Stewart Platform control library.

The *Config Cluster* parameters are the following:

- R_b – the radius of the base
- R_p – the radius of the platform
- Base angle (deg) – the angle between two neighbor actuators
- Platform angle (deg) – the angle between two neighbor platform joints
- S – the length of a rod which connects servo rod and platform
- a – the length of a rod connected to the servo motor

The 6DOF Cluster parameters are three axes motions and three axes rotations.

In order to start processing you should initialize the geometry using the *Config Cluster* parameters, two matrix for initial states of the base and platform which is b_i and p_i matrixes.

The XY Graph output of the Init VI graphically displays the initialized geometry of Stewart Platform.

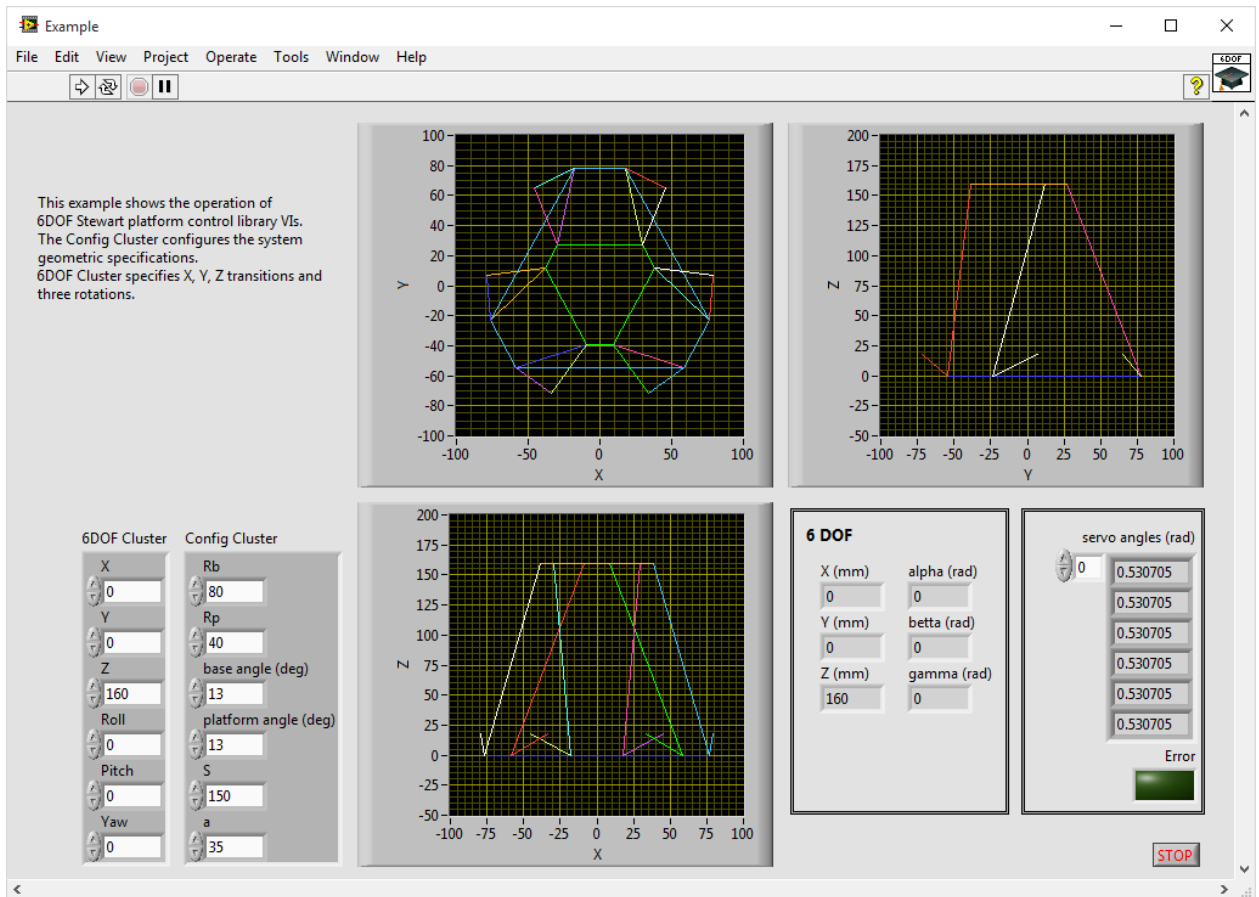


Figure 2 Example Front Panel

Connecting the initialized parameters, config cluster and the 6DOF cluster to the processing VI, it returns a cluster of the processing results with graphical visualization. In addition, it returns Li which is the solution for the mechanism with linear actuators.

The error indicator turns on if the user required input is out of accessibility area of the mechanism.

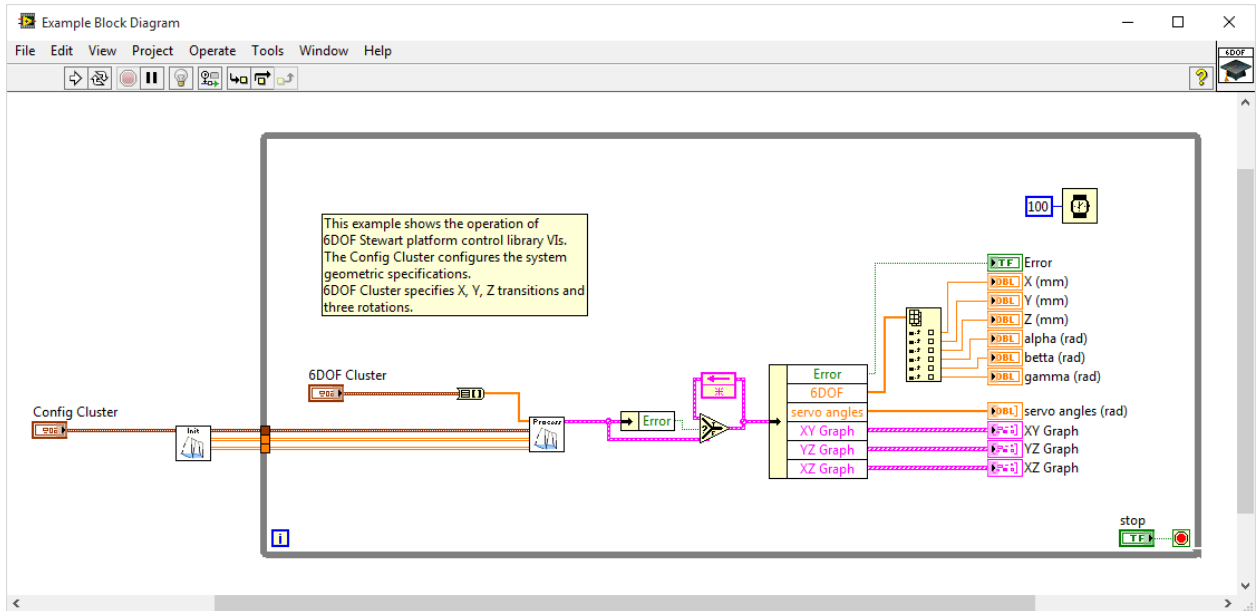


Figure 3 Example Block Diagram

4. System Requirements

- LabVIEW Base, Full, or Professional Development System
- Windows 7 and later

5. Support Information

For technical support, please, contact Ovak Technologies at:

Phone: +1.281.506.0020

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