

Online Execution of pRCBHT

Overview

The online execution of the pRCBHT has as a goal to analyze the torques produce by HIRO in simulation or real-experiment and produce the pRCBHT system analysis.

Currently the output of the pRCBHT in real-time consists of 3x6 files describing the:

1. Primitives for Fx, Fy, Fz, Mx, My, Mz
2. Composites for Fx, Fy, Fz, Mx, My, Mz
3. Low-Level Behaviors for Fx, Fy, Fz, Mx, My, Mz.

Conversion of Code from MATLAB to C

Currently, matlab code has been converted to C (not C++ although this is possible and will be done soon). Three types of projectes were carried out:

- A static library
- A shared library, and
- An executable

The C-code for each of these and the respective static library, shared library, and executable can be found at:

`/home/grxuser/src/OpenHRP3.0-
HRP2STEP1/Controller/IOserver/plugin/forceSensorPlugin/pRCBHT/matlabSrc_a`

`/home/grxuser/src/OpenHRP3.0-
HRP2STEP1/Controller/IOserver/plugin/forceSensorPlugin/pRCBHT/matlabSrc_so`

`/home/grxuser/src/OpenHRP3.0-
HRP2STEP1/Controller/IOserver/plugin/forceSensorPlugin/pRCBHT/matlabSrc_exe`

Compiling and Building

In order to improve debugging capabilities, it is desirable to link either the static or shared library to a main file (see pRCBHTAnalysis.c in both /matlabSrc_a and /matlabSrc_so) that will allow us to print to console how the program is operating.

The c-file should contain the following according to

(<http://www.mathworks.com/help/coder/ug/using-a-matlab-coder-dynamic-library-in-a-simple-microsoft-visual-studio-project.html>):

1. #include of the main headerfile for the project. Namely, pRCBHT.h
2. Call to the matlab initialization routine: pRCBHT_initialize();
3. Call to the main matlab function, in our case: pRCBHT();
4. Call to the matlab termination routine: pRCBHT_terminate();

With regards to the Makefile for the static library can be found within its own folder, namely: /matlabSrc_a/Makefile.

Note

Currently, I have been unable to properly link the static library to the main file. GDB warns that the three function calls in the .c file are an implicit declaration. This means it cannot see the proper declaration in the pRCBHT.h file and it thinks that the function calls are declarations.

Input and Output of pRCBHT Online Results

Input:

The pRCBHT code has been written such that the Torques_x-2y2z.dat file is read from the following location:

/home/grxuser/src/OpenHRP3.0-HRP2STEP1/Controller/IOserver/robot/HRP2STEP1/bin/

Output:

Similarly, when the code works properly, the 3x6 output files will be written to the following location:

/home/grxuser/src/OpenHRP3.0-HRP2STEP1/Controller/IOserver/robot/HRP2STEP1/bin/pRCBHT

Matlab Easy-View Report

For convenience, matlab produces a well organized and easy to read report. The report for each of the tree projects can be seen by directing a web broser to the matlabSrc_XXX/html/index.html file of each folder.

Links are included here for convenience when using my personal terminal:

- Static Library, [click here](#).
- Shared Library, [click here](#).
- Dynamic Library, [click here](#).