

Real-time plugin tutorial

Arturo Laurenzi, Luca Muratore
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XBotDays@IIT

Final goal

Write a simple RT plugin which

- Brings the robot to a homing configuration in **low impedance** mode
- Allows to enable/disable gravity compensation using the plugin built-in command port



Steps

- 1) Enable **XBotDaysWorkshop** package inside **superbuild**
- 2) Add a subdirectory to the project `CMakeLists.txt`
- 3) Generate the plugin **skeleton**
- 4) Build & install
- 5) Implement **init_control_plugin**
- 6) Implement **on_start**
- 7) Implement **control_loop**
- 8) **Build & install**
- 9) **Simulate** the plugin!

Enable XBotDaysWorkshop package

- check that CENTAURO_EU project is enabled
 - `cd $ROBOTOLOGY_ROOT/build`
 - `type cmake .`
 - enable CENTAURO_EU flag, press “c” to configure
- enable XBotDaysWorkshop package
 - enable SUPERBUILD_XBotDaysWorkshop, press “c” until “g” is available, then press “g”
 - `type make XBotDaysWorkshop`

Add subdirectory and generate skeleton

- go inside XBotDaysWorkshop main directory:
`cd $ROBOTOLGY_ROOT/external/XbotDaysWorkshop`
- `generate_Xbot_RT_Plugin.sh` `PLUGIN_NAME`
- inside `CMakeLists.txt`, type
`"add_subdirectory(PLUGIN_NAME)"`
- edit the plugin's `.h` and `.cpp` in some IDE

Implement the plugin

- **init_control_plugin:** initialize/preallocate all required variables, define a homing
- **on_start:** save initial robot configuration and initial time, set a low impedance value using setStiffness/setDamping
- **control_loop:** compute reference joint values from q_0 to q_{home} & gravity compensation torques

Advanced: enable/disable gravity compensation via the command port

References

- **Superbuild tutorial**
<https://github.com/ADVRHumanoids/advr-superbuild/wiki>
- **XbotInterface documentation**
<https://advrhumanoids.github.io/XBotInterface/index.html>
- **XbotInterface tutorial**
[\\$ROBOTOLGY_ROOT/external/XbotInterface/examples/src/ik_example.cpp](#)
- **XCM readme with video on how to generate/run a plugin:**
<https://github.com/ADVRHumanoids/XCM>
- **Already implemented plugin**
[\\$ROBOTOLGY_ROOT/external/XBotDaysWorkshop/XBotDaysPlugin](#)