GEAR UP FOR MAKING

Software packages for the third module

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Overview

For the 3rd module, a series of software packages are needed for robotic simulation, code generating and parametric modeling. Moreover, we will work with an industrial-grade robot which is profoundly different from the ones we have already used previously.

Please install the suggested version of every software and get familiar with their basic environment before the next class. Be advised that they mostly require you to use a trial version or license. For HAL, do it ASAP, since it may take a couple of days to have any response. Having a brief look at the robot manual is also encouraged. Please don't bother yourself with details, an overall intro is adequate.

Software and Hardware

The pre-required software packages are McNeel Rhinoceros 4 or 5 (32 or 64bit), Grasshopper 0.900XX and HAL 5. You can also look for RobotStudio 5.61 as an extra option for advanced functionalities.

On the hardware side, you must have a PC. There is no fully functional Macintosh version for almost any of the required software packages. If you only have Mac, then you should use Boot camp assistant to install Windows on your system. As of January 2015, Penn State provides students with a free version of Win 8.1 through OnTheHub online store. Please refer to this web page and follow the procedure.

ABB IRB 2400-M16:

This is an industrial robotic arm with 6 degree of freedom to actuate described motions with high level of accuracy. It can lift loads up to 16 kg and reach for maximum of 1.5 m. For more information, please refer to ABB web page.

Fact Sheet | Product Specification

RobotStudio

RobotStudio is the software package developed by ABB industries in order to support their robots. RobotStudio allows users to model robotic motions, simulate tools and their workflow. It also has a built-in code editor to edit codes written in RAPID language. For more information please refer to RobotStudio web page.

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Rhinoceros

This software is a powerful tool to model complex geometries based upon NURBS form definition. For more information please refer to rhino3d web page.

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Grasshopper

Grasshopper is a visual programming environment allowing users to explore computational design through a graphical editor. It is tightly integrated to Rhino. It is still in progress by David Rutten and rapidly expands by the help of users all around the world. For more information please refer to grasshopper3d web page.

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HAL

HAL is an add-on for Grasshopper allowing users to communicate with robotic arms through code. HAL can simulate the motion of the robot, and generate the related computer code to control it. For more information please refer to HAL web page and HAL group on grasshopper3d forums.

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To have this add-on activated, you should install it and run it. Then you should follow the instructions to generate the license request file. This file should be sent to the author, who will send you back the license file.