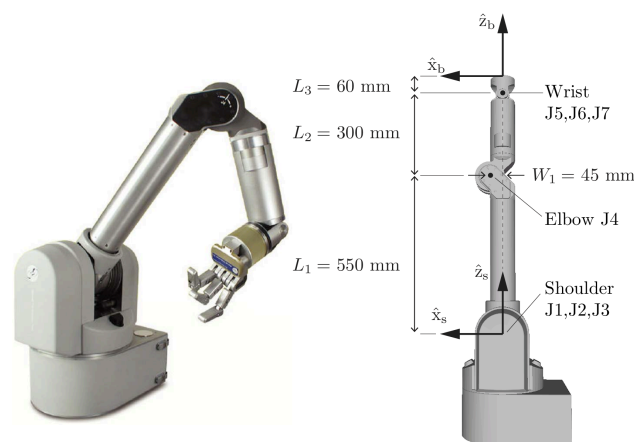


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Barrett WAM 7DOF Robot Dynamics Simulator:

We have developed a robot dynamics simulator in MATLAB for the Barrett WAM 7DOF robot. The WAM User's Manual was referenced for the joint limits. The URDF file was referenced for building the kinematic and dynamic models of the robots. However, the URDF file did not include the spatial inertia information for the first three joints, so we consulted the WAM Inertial Specification Manual for these values. These references are linked below and also included in our zip file submission.

Barrett WAM 7DOF



WAM User's Manual:

https://web.barrett.com/support/WAM_Documentation/WAM_UserManual_AH-00.pdf

URDF File:

https://git.barrett.com/software/barrett-ros2-pkg/-/blob/devel/src/wam_description/urdf/wrist_link.urdf.xacro

WAM Inertial Specification Manual:

https://web.barrett.com/support/WAM_Documentation/WAM_InertialSpecifications_AC-02.pdf

Instructions on how to run the code/application:

Note: You will need to have Peter Corke's MATLAB Robotics toolbox and Mathworks' Robotics System Toolbox installed on your system to run this application.

To run the code/application, open the robot_gui.m file (in the 'project' folder) and run it. The GUI should pop up and automatically run Gravity Compensation and populate the joint plots (position, velocity, acceleration, and torque). You can expand the GUI to full screen to better view the plots. To add inputs for position control, select each editable box and add a value for x,y,z and r,p,y. To add an input for an external force, select the corresponding editable box and

input a 1x6 wrench. Once your inputs are typed in, select the 'Calculate and Plot!' button. Once finished calculating, the robot plot will show the robot moving from the home configuration to the specified target point and the joint plots will update. *A video titled 'GUI_tutorial.mp4' is included in our zip file submission demonstrating how to run the GUI.*

Sample Inputs to try in the GUI:

A table of sample target configurations are shown below:

	X [m]	Y [m]	Z [m]	Roll [rad]	Pitch [rad]	Yaw [rad]
Sample 1	0.5	0.5	0.5	0.8976	0.8329	-0.6422
Sample 2	0.5	0.5	0.4	1.0501	0.8121	-0.7890
Sample 3	0.5	0.4	0.4	1.1229	0.6132	-0.8460

Sample external forces [N*m]:

[1 1 1 1 1 1], [2 2 2 2 2 2], [3 3 3 3 3 3]