Description on the simulation codes – version 0.1

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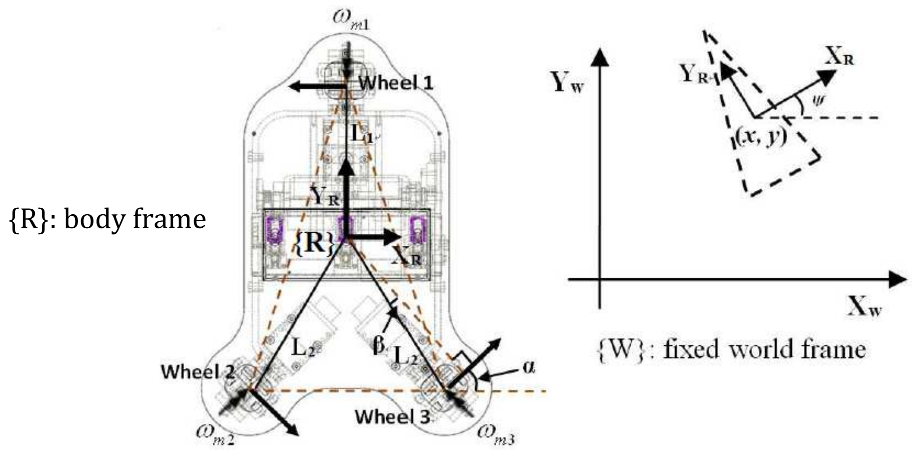
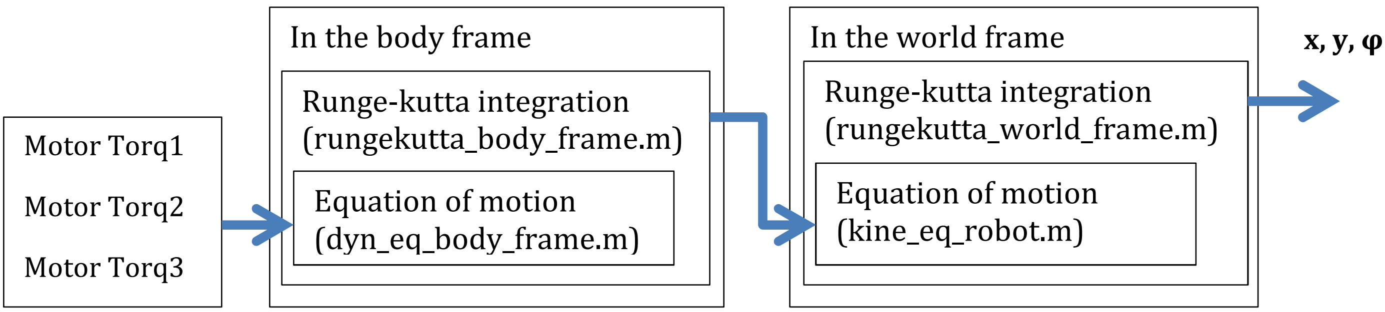
1. First please read the attached article, in particular, Section 2. Formulations in the codes are based on the article apart from the motor dynamics (that is, the motor dynamics is not implemented in the codes)

2. As presented in the paper, first the ArmAssist model is expressed in the body frame and then, its global position (x, y) and orientation (φ) are obtained in the world frame. The codes follow the same sequence. The global position and orientation denote the position and orientation of the body frame {R} located at the center mouse camera (See figure below).



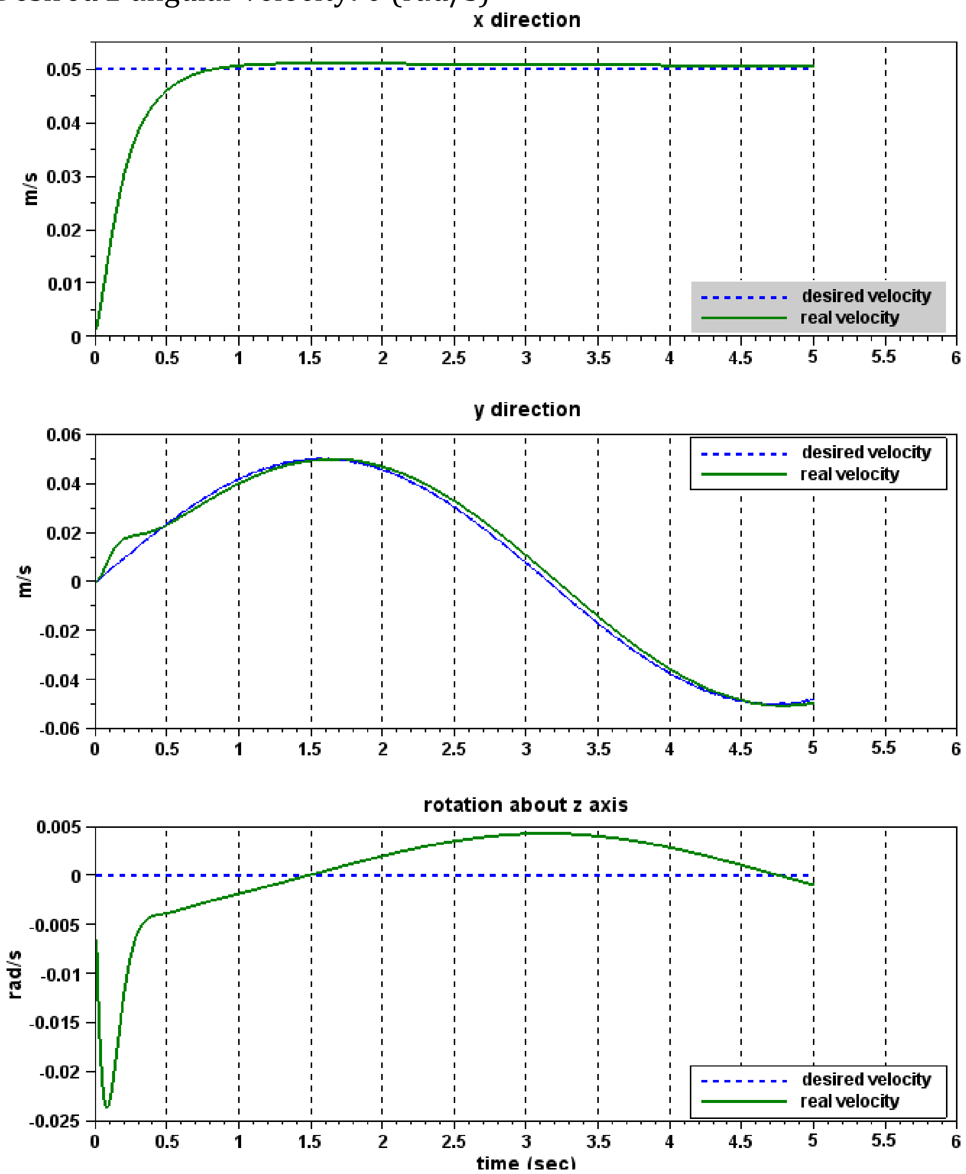
Flowchart of codes



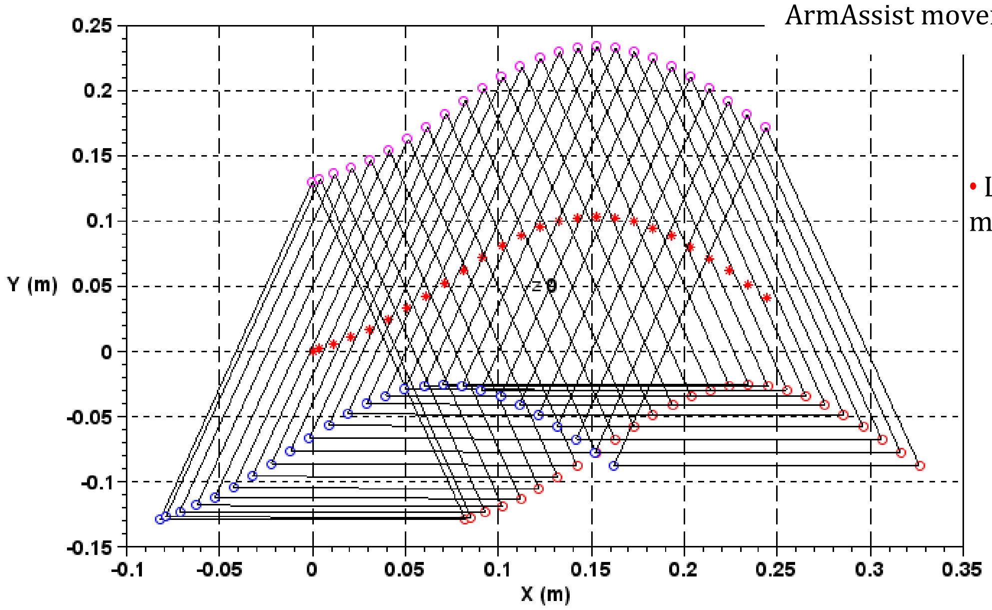
Note: If you want (or need), you can unify the equations of motion and derive one equation at the world frame.

3. You can see overall sequence of the simulation and used parameters in the sim_sample1.m file. Here I implemented a PI controller to track desired x and y translational velocities as well as angular velocities about z axis. (You can tune P and I gains if you want better performance)

Desired x-velocity: 0.05 (m/s)
Desired y-velocity: 0.05 *sin(t) (m/s)
Desired z-angular velocity: 0 (rad/s)



ArmAssist movement during the control



• Location of the center mouse camera