

Lab 2b: Omnibot “Drive and Aim” Report

The omnibot video is submitted online through gauchospace, where the lowest score obtained in a 4.

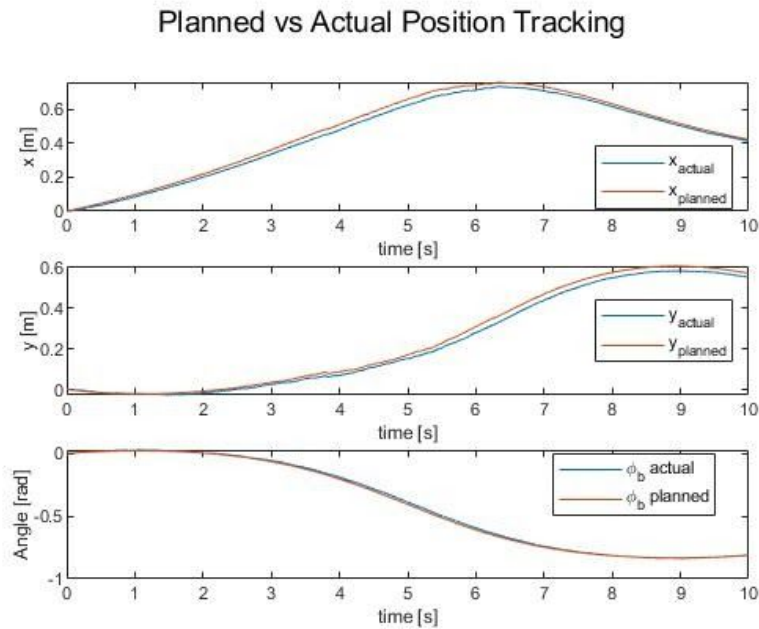


Figure 1: Position Reference Tracking

Figure 1, above, shows the omnibot’s reference position tracking for $x(t)$, $y(t)$, and $\phi_b(t)$. The actual and planned trajectories were plotted using forward kinematics in MATLAB to obtain the plots shown above. These plots contain good tracking, but they do not follow the intended $x(t)$, $y(t)$, and $\phi_b(t)$ path. The maximum x value should be 0.3048, while our actual x value obtained was 0.7332. The maximum y value should be 1.2192, while our actual y value obtained was 0.5834. The body angles match up nicely, if we ignore the initial offset of the body angle, which is around 0.6155. This position error could arise due to noise in the omnibot motor or an erroneous mistake in our MATLAB script and/or Simulink file. Since the omnibot tracked the point fairly well, we saw no need to correct this mistake. Although, in the future, a closer look at our MATLAB script should be done to ensure our planned simulink outcome matches the planned MATLAB script outcome.

Planned vs Actual Motor Angle Tracking

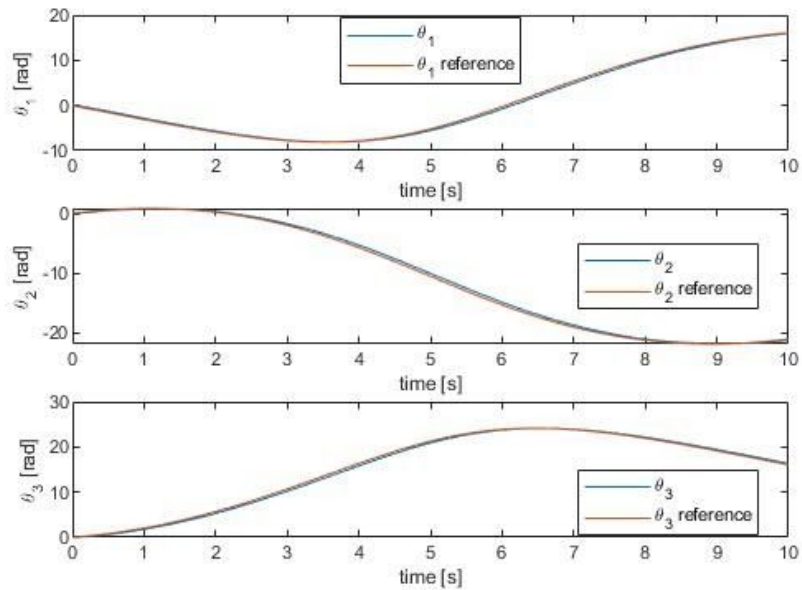


Figure 2: Angle Reference Tracking

Figure 2, above, shows the motor angle reference tracking for all omnibot wheels. The planned and actual motor angles tracked very well. This was due to a good choice of PD constants, where we used $K_p = 175$ and $K_d = 8$.