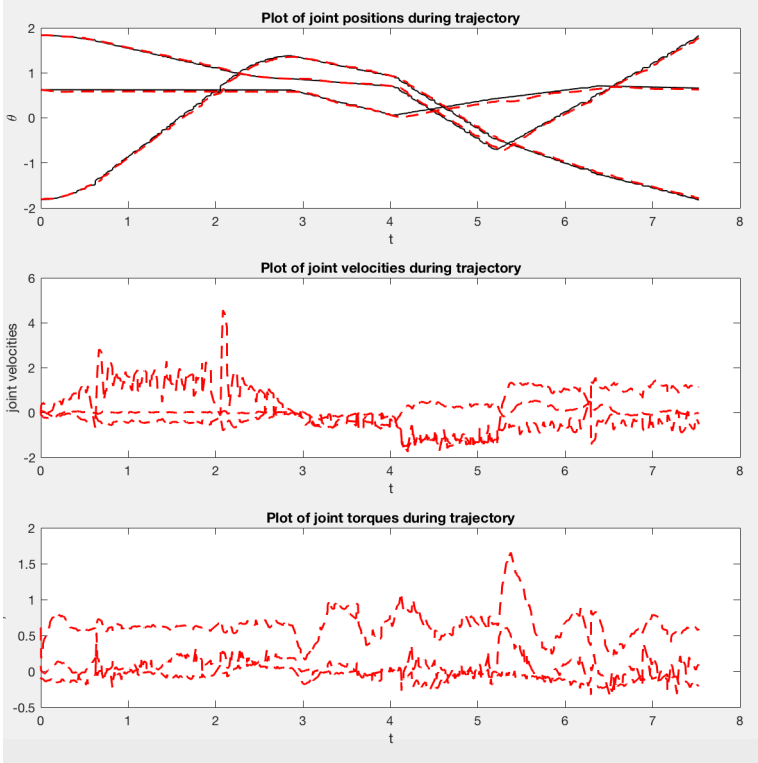
Ex.05.)
* Note: Robot was connected via WiFi, which likely caused the slight bumps in the plots due to latency.

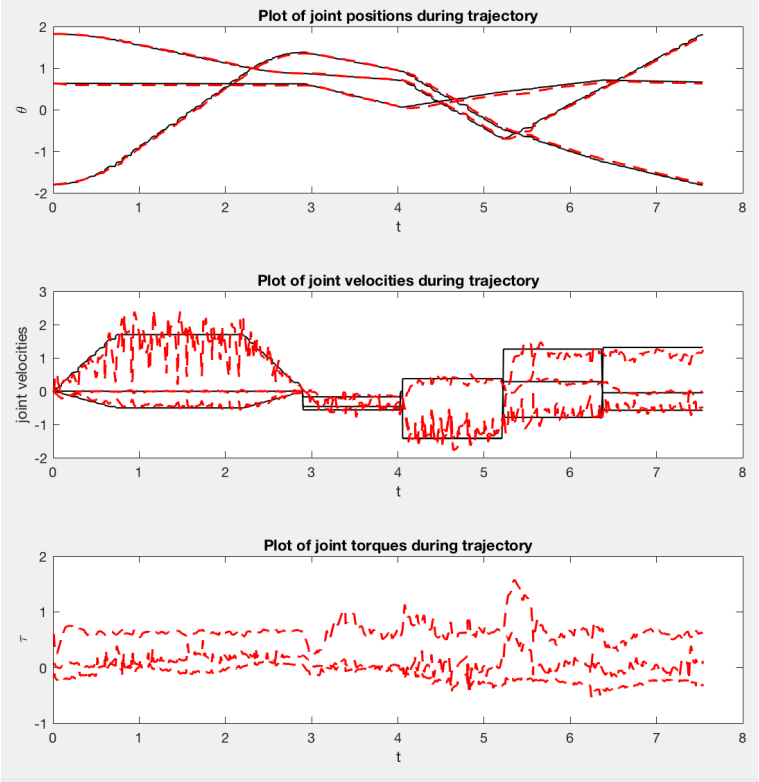
Trend observations:
For each of the trajectory types, those which explicitly commanded velocity present significantly smoother –and, thus, more stable- motor torques. Since torque is proportional to angular acceleration, this stability is a result of the commanded velocities putting explicit bounds on the acceleration. Without this, when just positions are commanded, the robot's controller will execute whatever velocities it needs to reach the given position as quickly as possible, causing the accelerations, and therefore motor torques, to be high and unstable. Additionally, due to their lack of sudden changes in acceleration (having bounded jerk), the cubic spline trajectories exhibit the lowest and most consistent motor torques throughout their commanded motions.

Constant Velocity Profile

Without Velocity Control

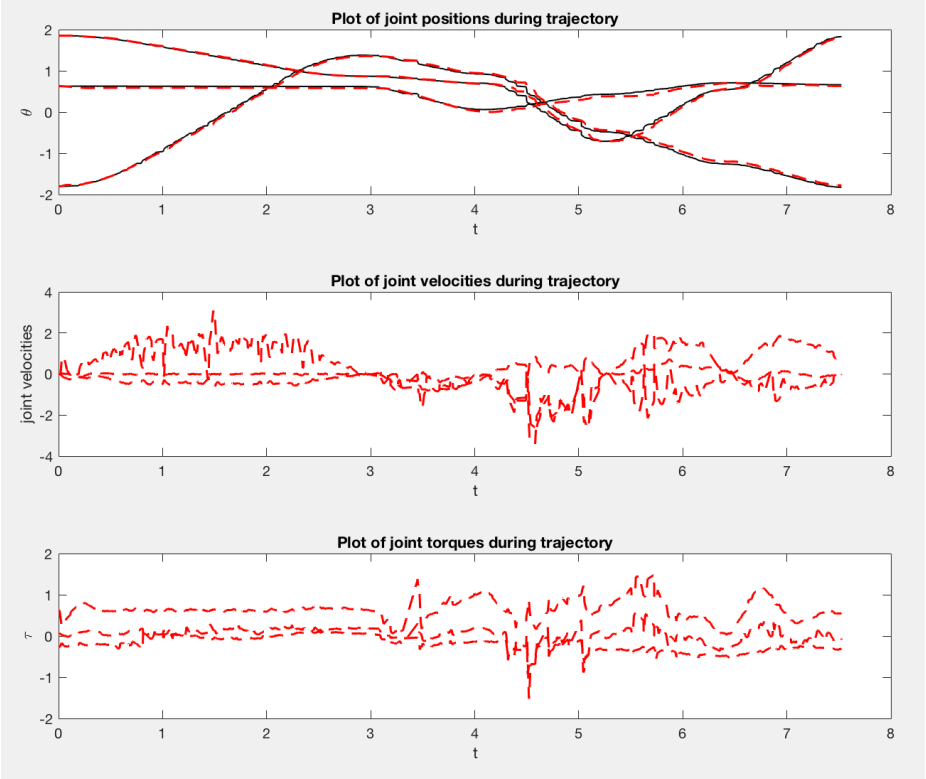


With Velocity Control

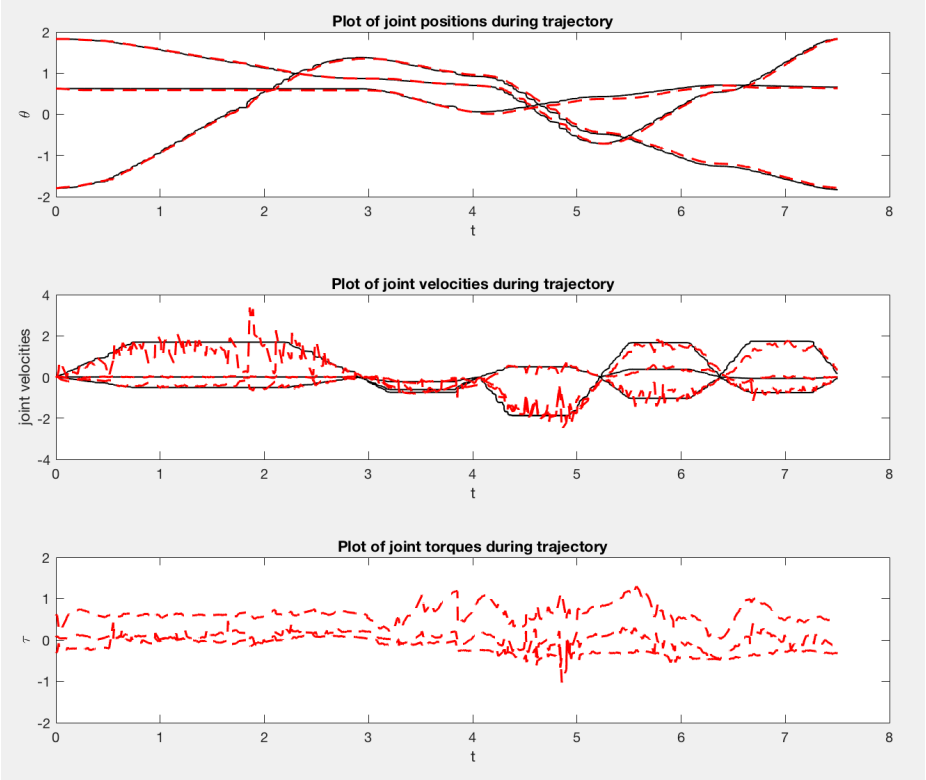


Trapezoidal Velocity Profile

Without Velocity Control

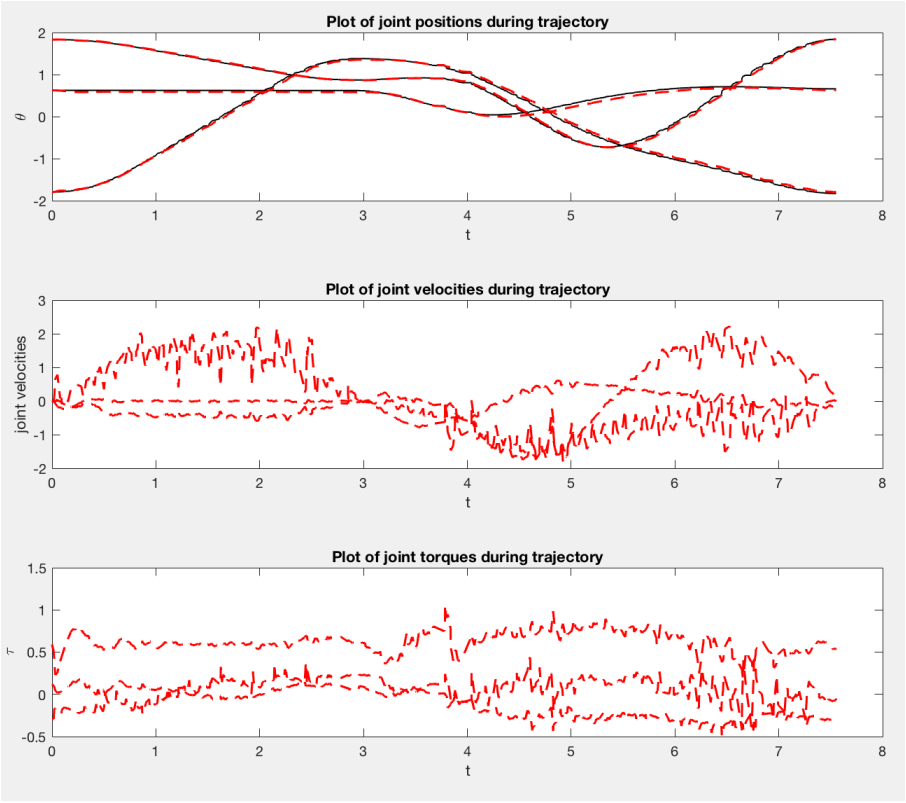


With Velocity Control



Spline Velocity Profile

Without Velocity Control



With Velocity Control