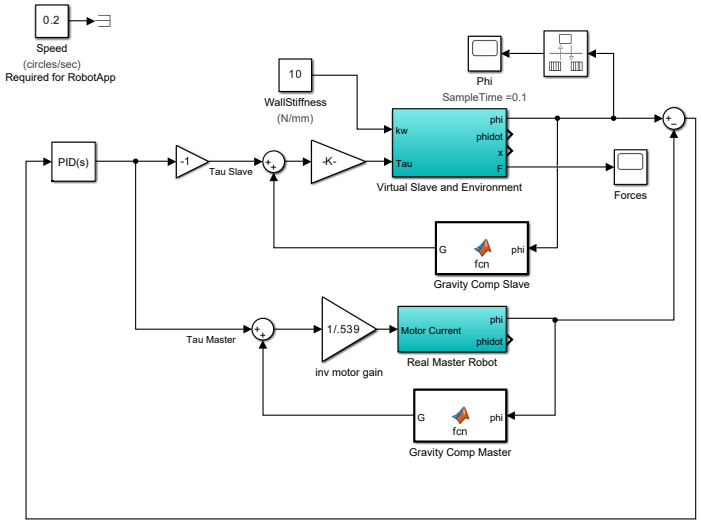
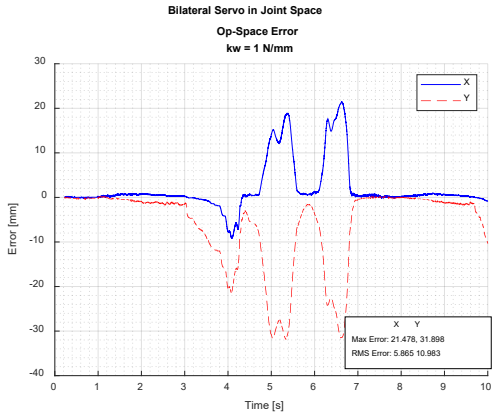
Robot Control Lab 7: Teleoperation

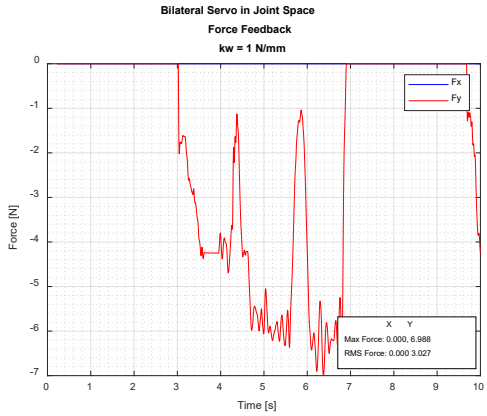
1 BILATERAL SERVO IN JOINT SPACE

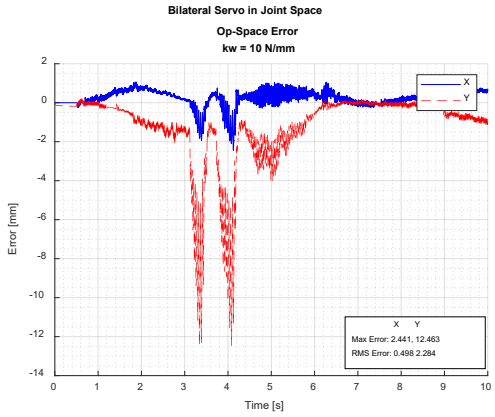
1.1 SIMULINK MODEL

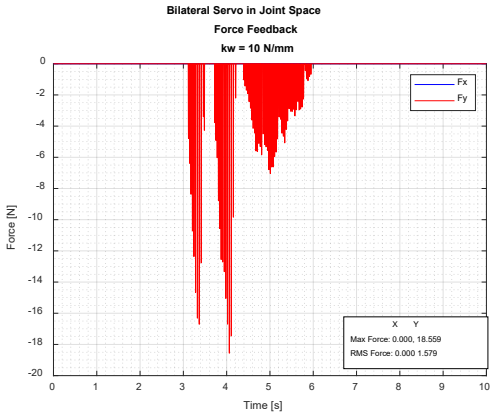


1.2 PLOTS







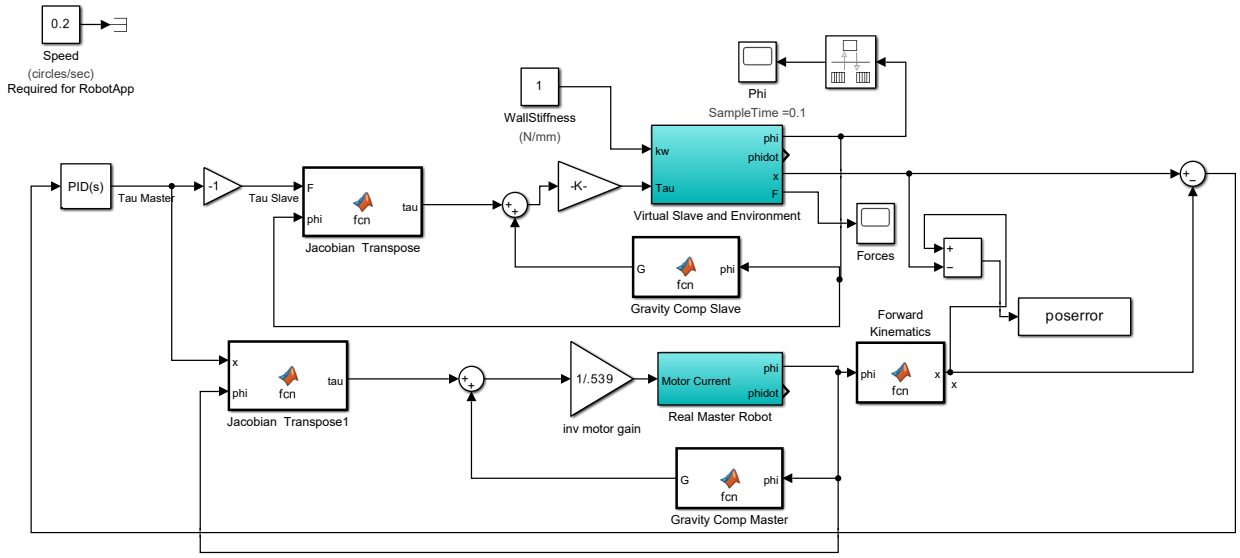


1.3 DESCRIPTION

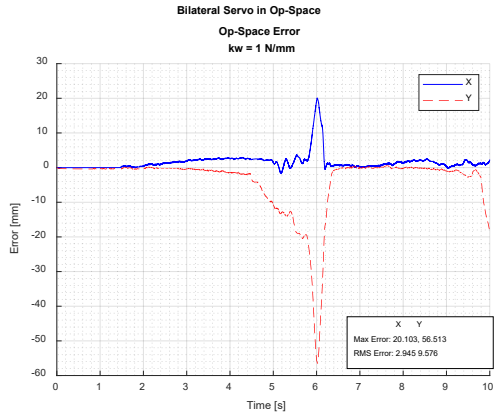
Similar in feel to class demonstration, had much more stiffness at 10. It had LOTS of chatter giving the force feedback on the master. Decent experience but definitely the worst controller in terms of feedback to master. There was lots of give when wall stiffness was low. Felt more like a gentle pull back than a feel. Felt like I had to push past the wall to get any kind of noticeable feedback.

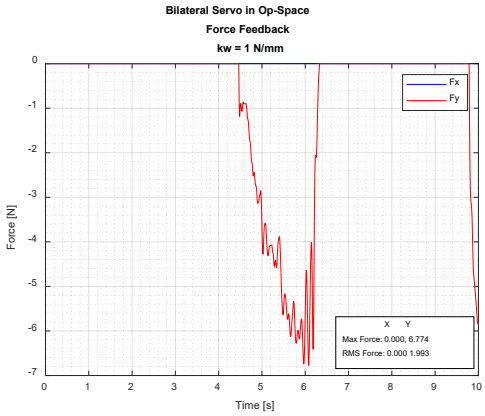
2 Bilateral Servo in Operation Space

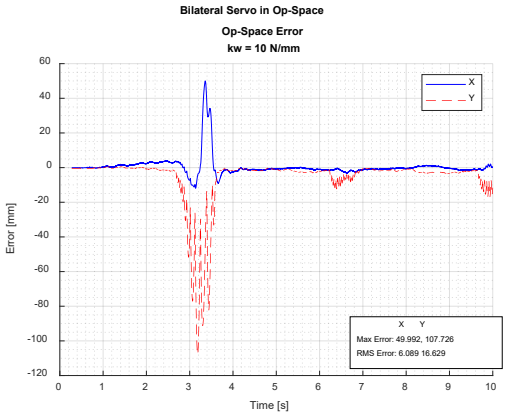
2.1 Simulink Model

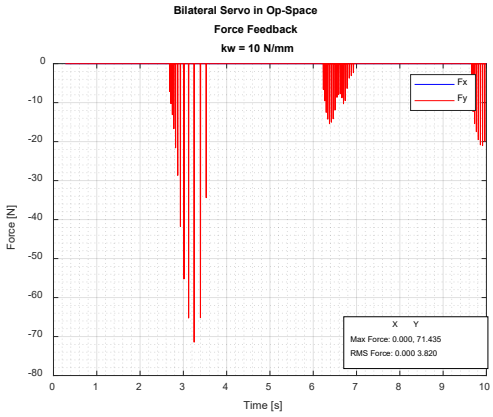


2.2 Plots







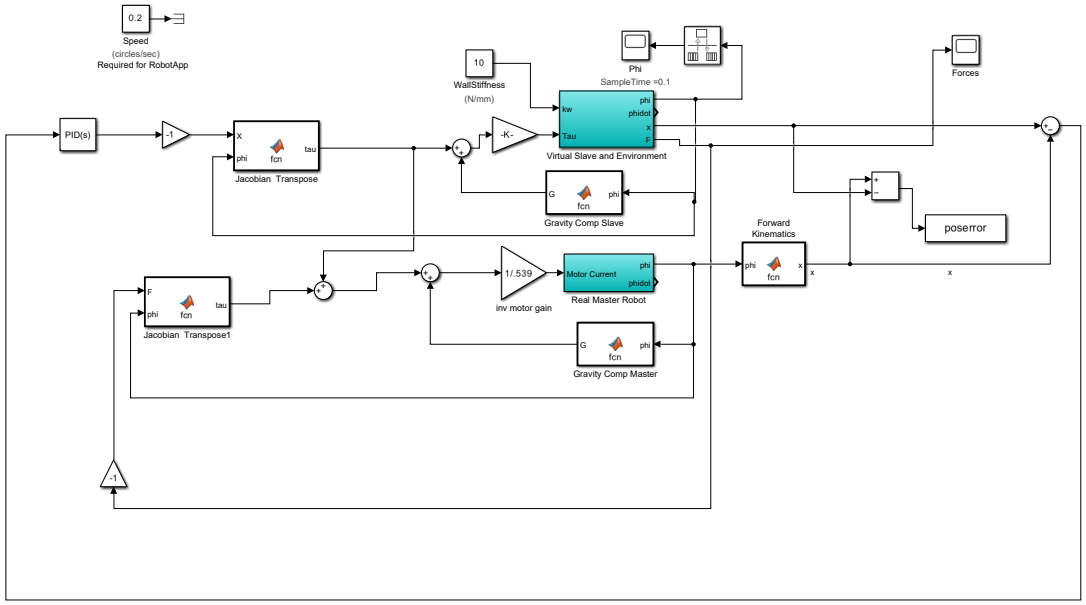


2.3 DESCRIPTION

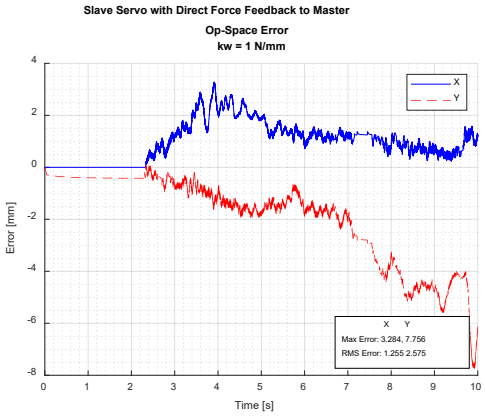
This controller had less chatter, but still had to push past the wall to get some feedback. Seemed to have a better description of the overall system.

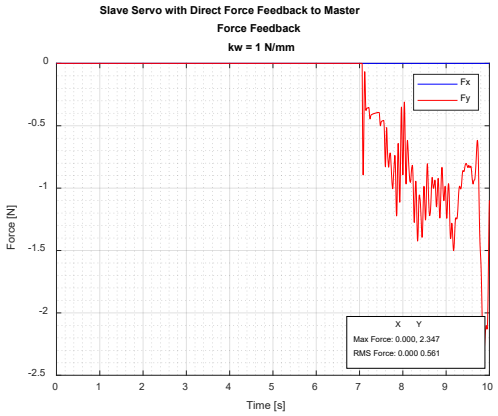
3 SLAVE SERVO WITH DIRECT FORCE FEEDBACK TO MASTER

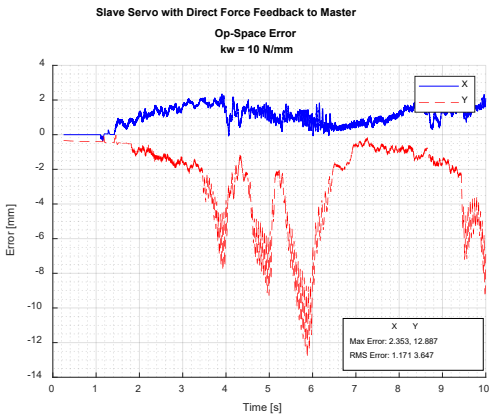
3.1 SIMULINK MODEL

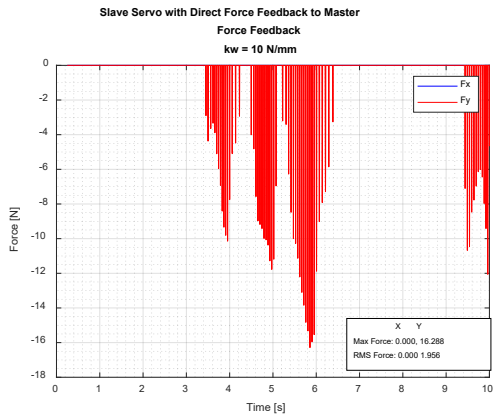


3.2 PLOTS







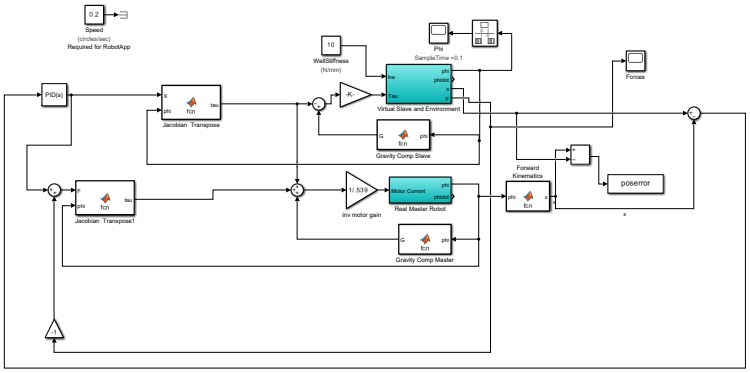


3.3 DESCRIPTION

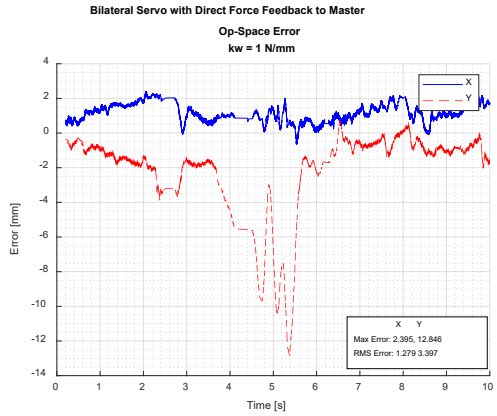
This was kind of sketchy, so we didn't push it as hard. We had some decent response, but there was lots of chatter within the system, and we had it go unstable. Wouldn't recommend this to anyone.

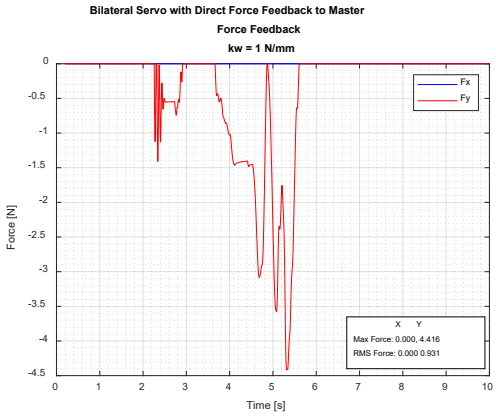
4 BILATERAL SERVO WITH DIRECT FORCE FEEDBACK TO MASTER

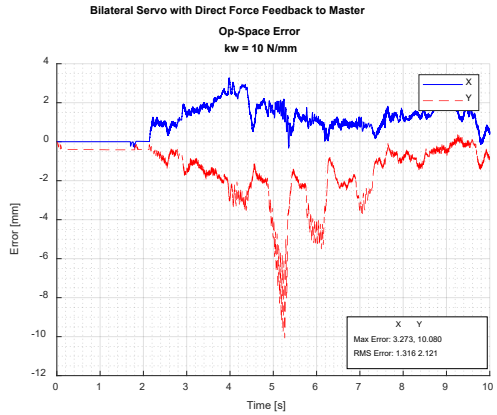
4.1 SIMULINK MODEL

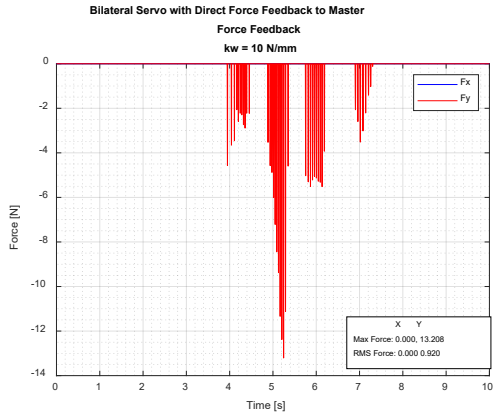


4.2 PLOTS







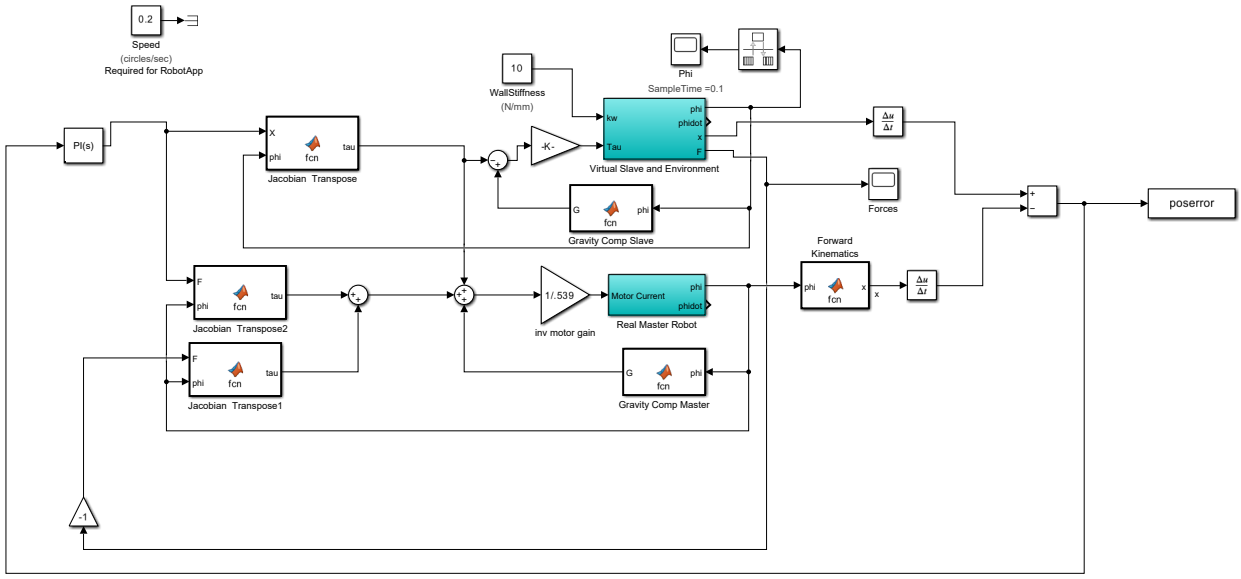


4.3 DESCRIPTION

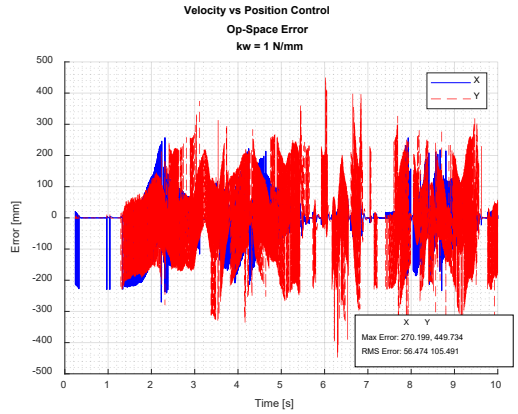
Felt much better than any other model. Really felt like there was a wall there and was interesting to see it work. We couldn't get as far in the higher-stiffness wall without a large amount of feedback. Felt smooth, and like the walls were well simulated.

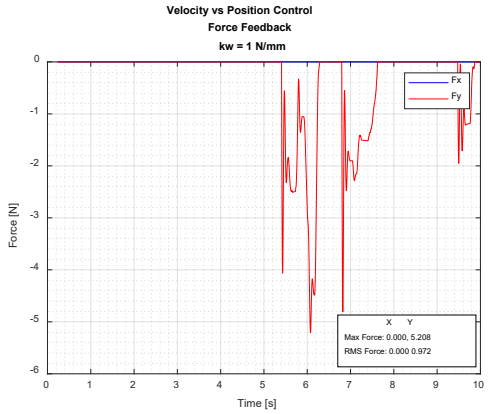
5 VELOCITY VS POSITION CONTROL

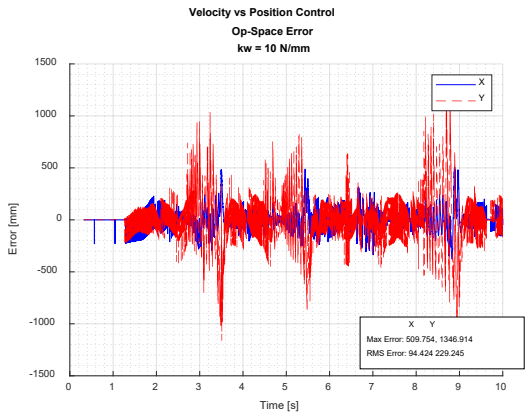
5.1 SIMULINK MODEL

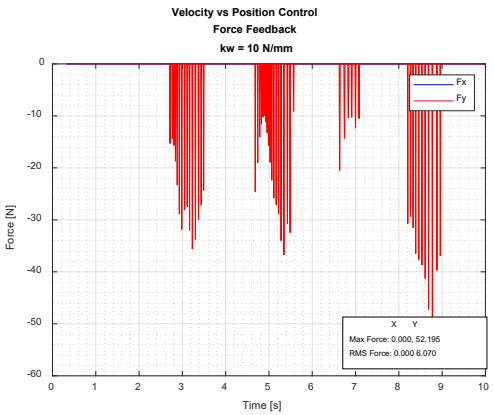


5.2 PLOTS









5.3 DESCRIPTION

Really interesting experience to start it at a different configuration than the master. Felt like there was mor error in our master's feedback. I'd recommend the Bilateral Servo with Direct Force feedback as the best overall experience. This was a good controller, but it didn't perform as well. That said, a different starting configuration could be an advantage in some situations.