Hello everyone, My name is Lin, syue cian.

Today, I will introduce the Model predictive control.

On the slides, we have to input our reference signal and plant feedback into the MPC. Next, the MPC can output the control move to the plant, and it will become the control input in the plant.

In this figure, we can know How the MPC operate. Control horizon means that the MPC output the control move in the horizon step. Prediction horizon means that after the model receive the control input, it will output the prediction. Clearly, we have to set up our model for the plant into the MPC, and it can select the highest fitness value according to optimizer and predictive model. Next section, I will explain my matlab code and its meaning.

The first picture, I build the A, B, C ,D matrix from course code, and use the ss function to struct the dynamic system. In addition, using discrete model will more easy to understand, so I set the sample time for the system. The third picture shows that I use the MPC function to build up model predictive controller. The last step is to give the reference signal we want, and it will use reference signal and predictive output to optimizer. Finally, we can get the control move from the MPC and prediction.

Without a doubt, the left figure is the control move, and the right figure is the reference signal and prediction output. Consequently, it is similar to references’ signal, and we only need a plant’s model and reference signal. Model predictive controller can give control move and make it to fulfill the reference’s signal.