Process Control-Design, Analysis and Assessment
Professor Raghunathan Rengaswamy
Department of Chemical Engineering
Indian Institute of Technology, Madras
Conclusion Lecture

I would like to offer a quick set of concluding remarks for this course. First I hope this course was useful and you learnt control in a slightly different manner than what we have been used to in in standard curriculum.

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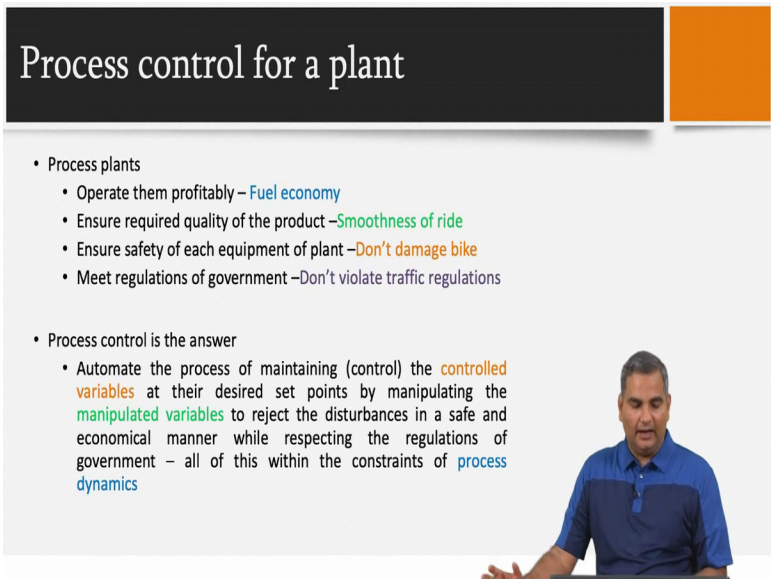

Just summary of what we learned. I started by saying process control is everywhere. I gave you examples of bike, our human body, air condition systems and so on. So cars, nothing works without process control. And the idea of using process control for plant, we talked about this. We want to operate plants profitably. We do not want to uhh have problems with environment. We do not want to send nasty stuff into the environment.

We want to produce products which are reliable, which are useful and so on. So for all of this, we said process control is critical. Process control is the key to be able to follow all the objectives that we are interested in while minimising the impact of whatever we do in terms of the environment, in terms of energy usage, in terms of wastage and so on. Right? So for this process control, we said there is this notion of control variables and manipulated variables and the notion of process dynamics where we figure out how the manipulated variables affect the control variables and so on.

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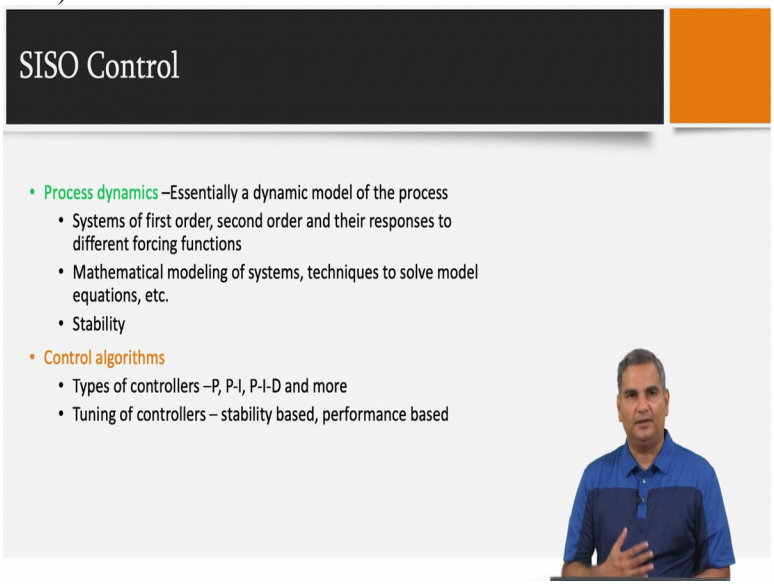

We started by what we called as a single input signal output control system. We talked about different types of models. Without about different types of controller - P, P-I, P-I-D and so on. And then we said the control structure selection is actually choosing which type of controller that you are going to use as far as this course is concerned. And tuning would mean finding a value for this parameter and then we said tuning of controllers can be broadly classified as being based

on stability or performance and then we went through several ideas in stability based and performance-based controller tuning.

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We then moved on to multiple input multiple output system. We said real processes are generally multiple input and multiple output. So we looked at how we can extend things that we have learned from a SISO control viewpoint to this MIMO. So we talked about decoupling, we talked about bringing in more loops within the SISO control framework and then finally we talked about the model predictive control. Though I talked model predictive control from a SISO viewpoint I showed you how it can be very very easily extended to MIMO control.

In fact, Uhh most of the advanced controllers, we got them being implemented in the industry or the MPC type. So that is a very important area for all of us to be comfortable with.

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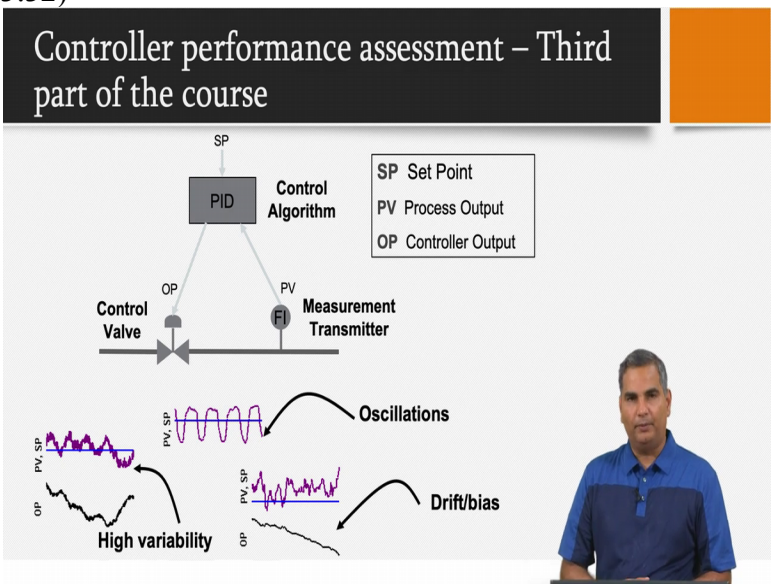

So I was also hoping and this I had shown in the initial introduction video, I was also hoping that I could teach a bit of controller performance assessment. However, since we extended the lectures on the MIMO control a little bit of advanced control quite a bit more than what we had originally planned, within the 12 week course, I do not have the time to also cover controller performance assessment.

However, just as a recap of what I said in the induction, basically we have learnt how to come up with control structures, how to tune these controllers and so on. However, once these controllers are in place, they work for a long time. So once they start working, the questions of interest are if I have several controllers in my plant and I have let us say budget to kind of maintain these controllers, which ones do I maintain is an interesting question to answer.

So that would mean answering questions like which of the controllers are not doing as well as they are supposed to do. So how do we find out performance of a control loop? And how do we get these performances so that we say these loops are working better than the other loops? How do we find loops that are critical and require maintenance in the next maintenance cycle and so on? So all of these questions are answered by this field of controller performance assessment.

What we will do is while I close this course with whatever we have taught till now, we will record some of the videos on controller performance assessment and they will make them available as extra material after the course is over so that people who are really interested in

understanding and learning more of this milk can come back and look at those videos outside of the material that has been taught in this course.

So with that, I would like to say thank you for everyone who has persisted till now and gone through all the 12 weeks of this course. I hope that this course gave you a nice view of control slightly different view of control, a simple view of control and hopefully you will be able to use this in whatever future work that you do in this area. Thank you.