Future Perspectives of PID Control
(Panel Session)

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Content

• TUPRAS in brief

• PID Control in Turkish Industry

• PID Control – Challenges

• PID Control - Future
TUPRAS

• Turkey’s largest industrial enterprise
• 4 refineries
• 28.1 million tons annual crude processing capacity
• Nelson complexity : 7.25
• Process Control Groups established for 3 refineries with completed MPC applications
TUPRAS – PID Control

- PID Control is the most dominating feedback control.
- PID covers almost all control loops.
- MPC applications are built on PID controllers at the basic level.
- Other control strategies, e.g. Fuzzy, NN are not common and built on PID controllers as well.
- Common tuning method : IMC tuning method
- Autotuners : not prefered commonly
TUPRAS – PID Control

• Common PID Control Algorithms used:

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<tr>
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• I-PD ensures stable control characteristics even when the setpoint value changes abruptly when the SV is set via numerical value entry.
• At the same time, the algorithm ensures proper control in response to the characteristic changes occurring in controlled processes, load variations and disturbances by performing proportional, derivative and integral control action accordingly.
**TUPRAS – PID Control**

- Common PID Control Algorithms used:

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- PV derivative type PID control algorithm (PI-D) only performs proportional and integral Control Action when setpoint value changes, but not derivative Control Action.
- Used in the situations where the better follow up to the setpoint value change is required, such a downstream control block in a cascade control loop.
PID Control - Challenges

• Control Problem :
  • Tracking the setpoint
  • Handle disturbances
  • Robust
PID Control - Challenges

• Common idea that PID controllers are under performed.

• Reasons :
  • Number of controllers
  • Lack of maintenance engineers
  • Controller Performance Monitoring Tools not widespread
  • MPC and PID interaction
PID Control - Challenges

• MPC and PID interaction

  • Model Predictive Control is usually used in supervisory mode with PID controllers
  
  • MPC deals with slow interactions, while PID deals with fast interactions in complex systems.

  • Instead of base layer approach, MPC can be favored for simple interacting loops: large numbers of MPC controllers.
PID Control - Conclusion

• Controller performance monitoring tools are essential

• User friendly diagnostics tools and autotuners will decrease the maintenance time and effort.

• Advanced control techniques will require PID at the base layer and will hold its dominance. (embedded MPC (?))
• The hierarchy of automation systems has been steadily growing.

• From PID level to APC, RTO with planning, scheduling and management levels are expected to be integrated.

• With the integration PID controllers and their performance will be more significant.
Thank you...