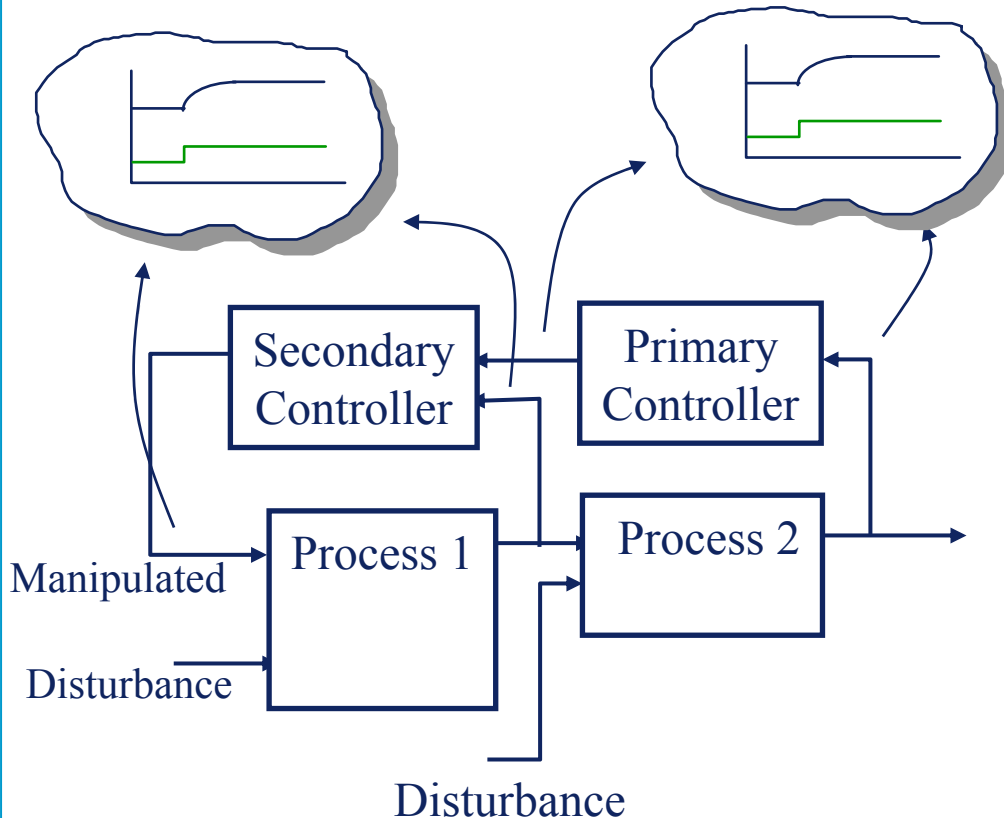


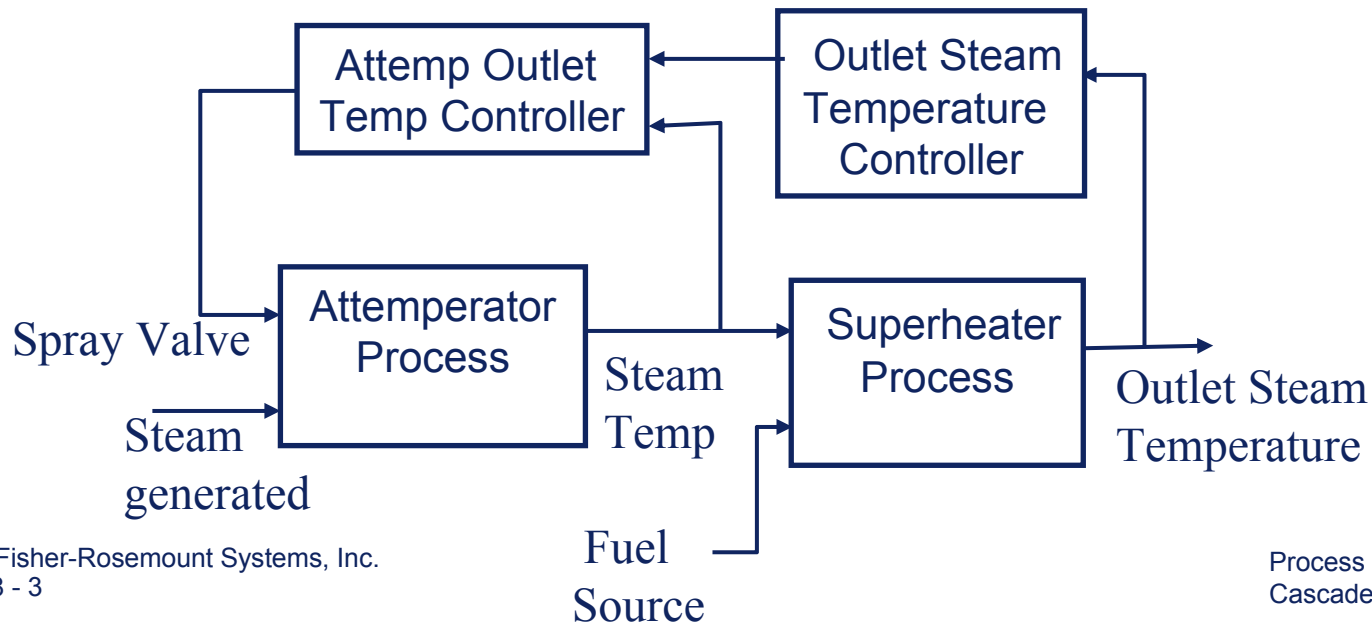
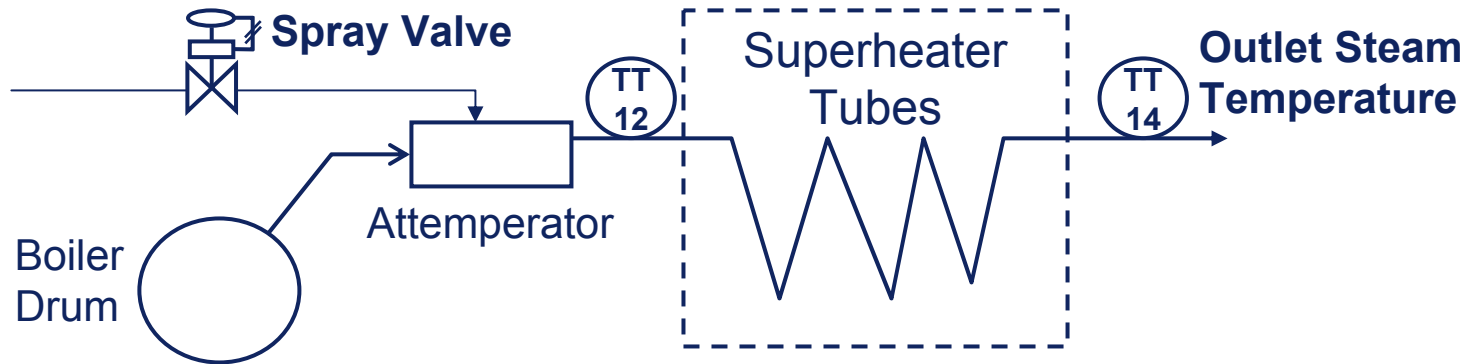
Cascade Control

Basis of Cascade Control

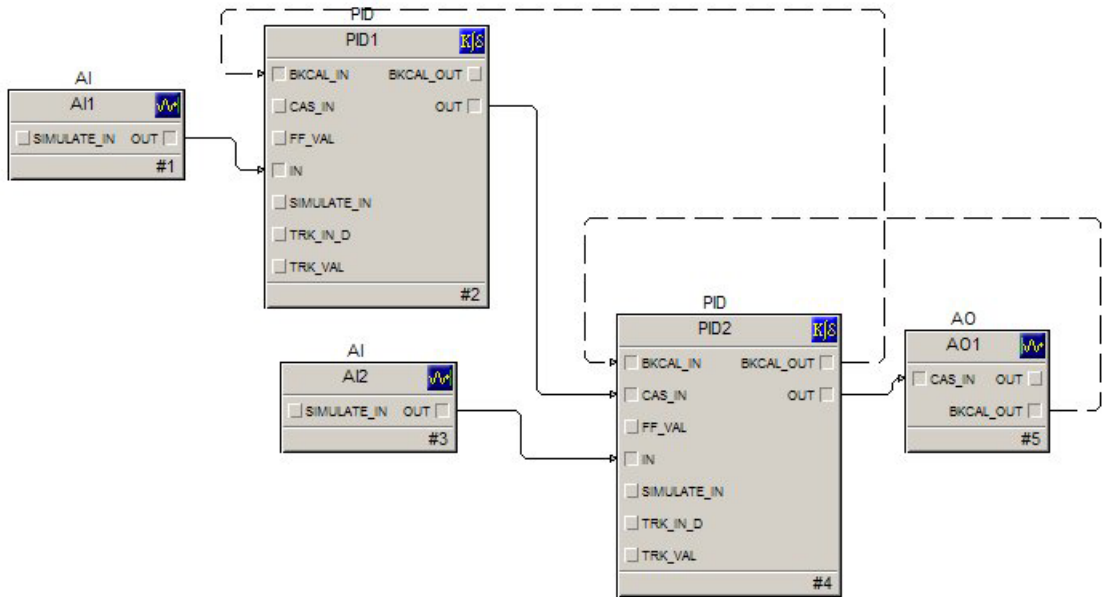


- A controlled process may in some cases be considered as **two process in series** in which the output of the first process is measured.
- When each process is subject to unmeasured disturbances, the control performance can be improved by an additional feedback loop.
- The outer loop output becomes the setpoint of the inner loop.
- Disturbances to the inner loop are corrected for and thus have little effect on the controlled parameter

Example - Cascade Control



Cascade Control in DeltaV

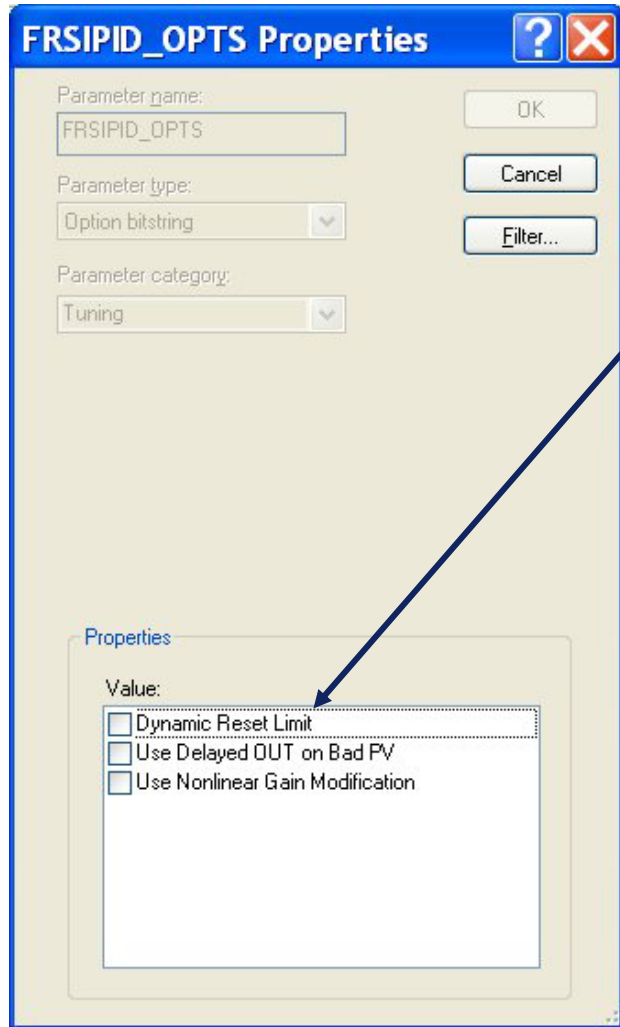


→ In Cascade mode, the setpoint of the secondary loop is changed by the outer loop through the CAS_IN connection.

Disturbances to the inner loop are corrected for and thus have little effect on the controlled parameter.

The BKCAL_IN connection is used for bumpless transfer and prevention of windup when the downstream loop is limited.

Cascade –Dynamic Reset



- Select FRSIPID_OPTS for Dynamic Reset Limit in the primary of the cascade to automatically compensate for poor response of the secondary loop.
- The CONTROL_OPTS in the secondary must be set for Use PV for BKCAL_OUT for Dynamic Reset Limit to provide benefit.

Cascade Control Workshop

- Step 1. Open EXAMPLE_E and go to on-line operation in Control Studio. Set the mode of the secondary loop (PID2) to manual. Make a step change in the OUT of PID2 and observe the response of the two process outputs. What difference do you notice in the response of the two outputs.
- Step 2. Place PID2 in Auto mode and change the setpoint to 50. Observe the process response and also the automatic tracking that is done by the primary loop.
- Step 3. Place the PID2 in Cascade mode. With PID1 in manual mode, change the output of the PID1 and observe the change in the setpoint of PID2.

Cascade Control workshop (Cont)

- Step 4. Place PID1 in automatic mode and observe the response when a change is made in the setpoint. With PID2 in cascade mode and PID1 in automatic, make a step change in the load disturbance. What impact was there on the secondary loop? Did the primary loop change as a result of the change in load disturbance?
- Step 5. Enable FRSI_OPTS, “Dynamic Reset Limit” in PID1. Enable CONTROL_OPTS “Use PV for BKCAL_OUT” on PID2 and make a change in PID1 setpoint. Did you notice any difference in the response.
- Step 6. Enable BYPASS in PID 2 and observe the difference in response when the setpoint of PID1 is changed.

EXAMPLE_E

