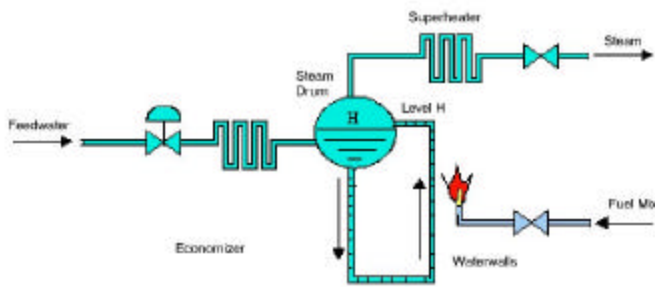
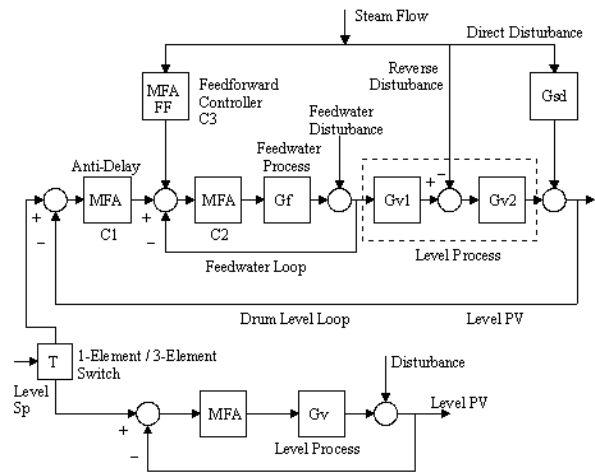


Model-Free Adaptive Control on Steam Drum Level

<i>Use of MFA Control</i>	<i>Benefits</i>
Anti-delay and Feedforward MFA effectively handle the “shrink and swell” problem.	Steam boiler drum level is controlled within its high and low limits during large steam pressure load changes and other plant upsets.
Prevents level running too high or low.	Safety and productivity of the steam system is improved.
Prevents steam systems’ shutdown.	Production efficiency and throughput are increased.
Helps control steam temperature.	Energy savings achieved.
Improves efficiency & productivity.	Full investment is returned in months if not sooner.



This 1-Element/3-Element Drum Level MFA Control System can be easily launched to control the drum level when there are large disturbances in steam load, feedwater flow and fuel mix flow.



Case History: Multiple installations in power plants and industrial steam boilers

The power crisis and ever-increasing energy demands require energy generators and consumers to improve efficiency and reduce energy usage. A company’s bottom line and competitive position is now directly tied to whether energy can be efficiently used for production.

Heavy energy consumers today just cannot afford a triple price increase in energy usage. It is scary when profit margins are taken away over night by increased energy costs.

In order to sustain in business, companies in the process industry must invest in areas where energy production and consumption can be made more efficiently.

The steam drum level control in an industrial boiler or power generator is one of the key areas that major im-

provement can be made to achieve quick return-on-investment.

The steam drum level needs to be kept around the midline to prevent either heat stress on the boiler water tubes (level too low) or corrosion (level too high). Improper control of the level can cause system shutdown, waste of energy, and short equipment life cycle.

Key variables affecting the drum level are feedwater inflow, steam outflow and fuel/mix inflow. Each variable has its own distinctive type of disturbance. Colder feedwater creates a pure delay time in response. Sudden increase of steam outflow causes a distinctive “shrink and swell” response. It will confuse the controller because this response will temporarily change the process “directing type.”

CyboSoft’s three-element MFA control system can effectively control steam

drum level. The MFA level controller is cascaded with the feedwater controller to regulate the drum level and compensate for disturbances from feedwater and steam outflow. The Anti-Delay MFA controller handles the large varying delay time in the level process. Feedforward MFA controllers keep feedwater supply in balance with steam demand changes.

Using an MFA control system on steam drum level confers multiple advantages:

- Drum level can remain in automatic control constantly across a broad operating range with large disturbances and steam load changes;
- The 3 element feedforward compensation is simple to implement when using a Feedforward MFA controller;
- No process model or identification are needed, which makes commissioning and maintenance easy.