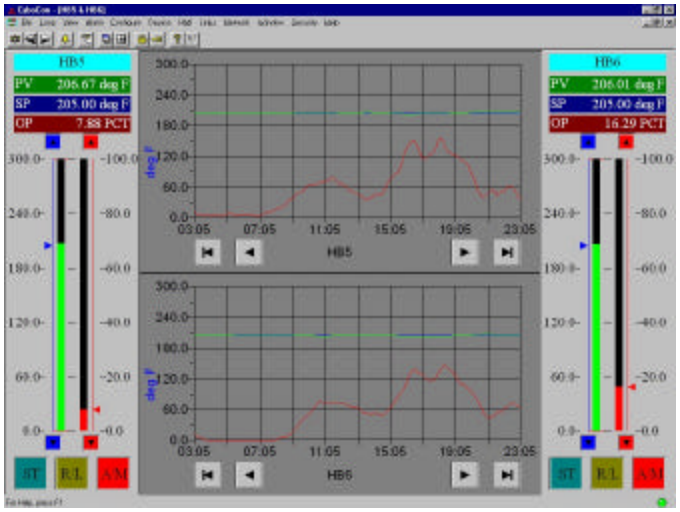
Model-Free Adaptive Control on Tomato Hot Breaks

Use of MFA Control	*Benefits*
Handles wild tomato flow and other process upsets.	Temperature control is improved by at least a 50% reduction in temperature variability.
Prevents tomato paste overheating.	Steam consumption is reduced.
Reduces clogs in the vessel due to improved temperature consistency.	Less cleaning and maintenance are required.
Reduces variation in temperature and product density.	Product quality and production efficiency is improved.
Improves efficiency & productivity.	Full Return-On-Investment is achieved in less than one season.



MFA controllers in CyboCon software quickly and tightly controls temperature (green) by manipulating steam (red) to compensate for wild tomato inflow without using feedforward control.

Case History: MFA at Del Monte Foods, Woodland, CA, reported in Food Engineering Magazine

From July through early October, the plant operates 24 hours per day as a continuous caravan of gondola trucks unloads tomatoes into flumes feeding the hot-break lines. Continuous throughput is critical to cost efficiency during the short processing season and the major problem is maintaining optimum temperature in the hot-break process. Product flow is irregular between truckloads, causing temperature variations in the rotary-coil hot-break systems. Hot-break process variables include tomato flow, steam pressure, condensate pressure and temperature of the incoming product but the biggest variable is flow rate which can change from zero to 50 tons per hour in minutes.

The PID loop controlling the steam valve which regulated hot-break temperature was incapable of optimally adjusting temperature to compensate for the intermittent flow rate. The plant installed a CyboCon model-free adaptive (MFA) control software with nine MFA controllers to control temperature of the hot-break lines. CyboCon integrates with a FIX SCADA software communicating with Allen-Bradley PLC's.

CyboCon was installed in just a few hours. The PID loops were retained offering the operator a choice of control, "but since installation the operators have used CyboCon 100 percent of the time," said Operations Manager, Rick Fenaroli. Product temperature now typically varies within less than +/-2 degree F. At the end of the processing season there had been no failures in any of the nine CyboCon loops and managers were evaluating further applications with multiple inputs and a single output such as in boiler control, and reducing solids variability in evaporator control.