



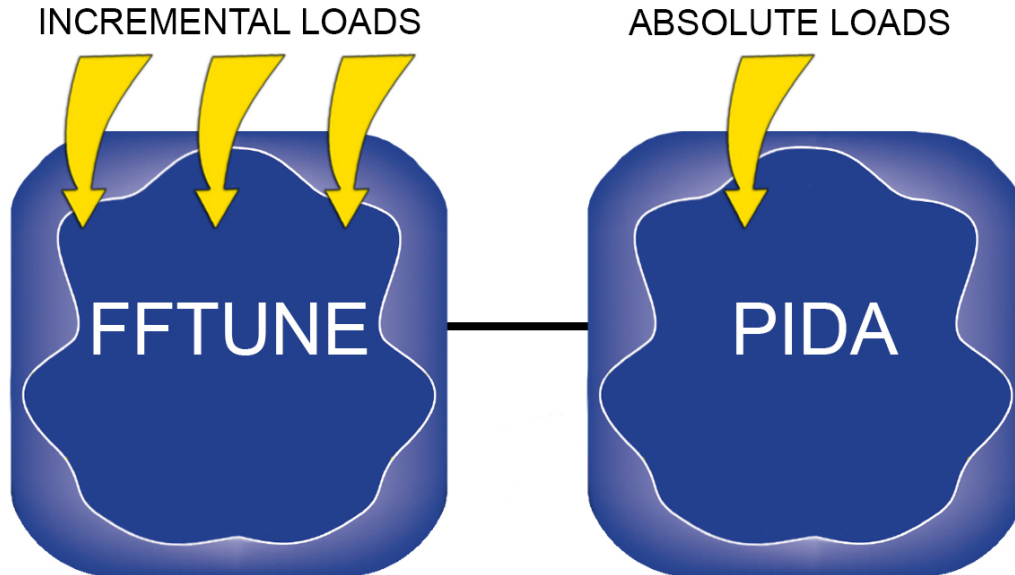
Foxboro™ DCS

Feedforward Adapter (FFTUNE) Block

PSS 41S-3FFTUNE

Product Specification

May 2019



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Overview

FFTUNE is an extender block used with the PIDA Controller. FFTUNE contains adaptively tuned feedforward compensators for up to four measured load signals, one of which may be the absolute feedforward input of the PIDA (MULT_IN or BIAS). Other loads are applied directly to the FFTUNE and corrected incrementally.

Adaptation will occur when a natural or deliberate disturbance affects one or more of these loads, provided the error response to the disturbance is significant and isolated. An isolated response requires a start from a quiet state and a final settling to the quiet state within a response time dependent on the process.

The feedforward self-tuner operates independently from the feedback tuner and needs no pretuner. It uses the method of moments applied to isolated transient responses to identify the first few terms of the series expansion of the Laplace transform for the loads, controller output, and controlled variable. The projection method is used to find the smallest changes in transfer function model parameters consistent with the last set of signal moments. The model parameters are used to update gain (effective) and delay compensators.

If the process seems to require (unrealizable) negative effective delay, no dynamic compensation is made and the gain compensation is diminished.

If the feedforward compensation is absolute, multiplicative or additive, the compensator gain is not adapted. The gain of a multiplicative compensator is determined by the output of the feedback controller. The gain and sign of an absolute additive compensator is manually settable.

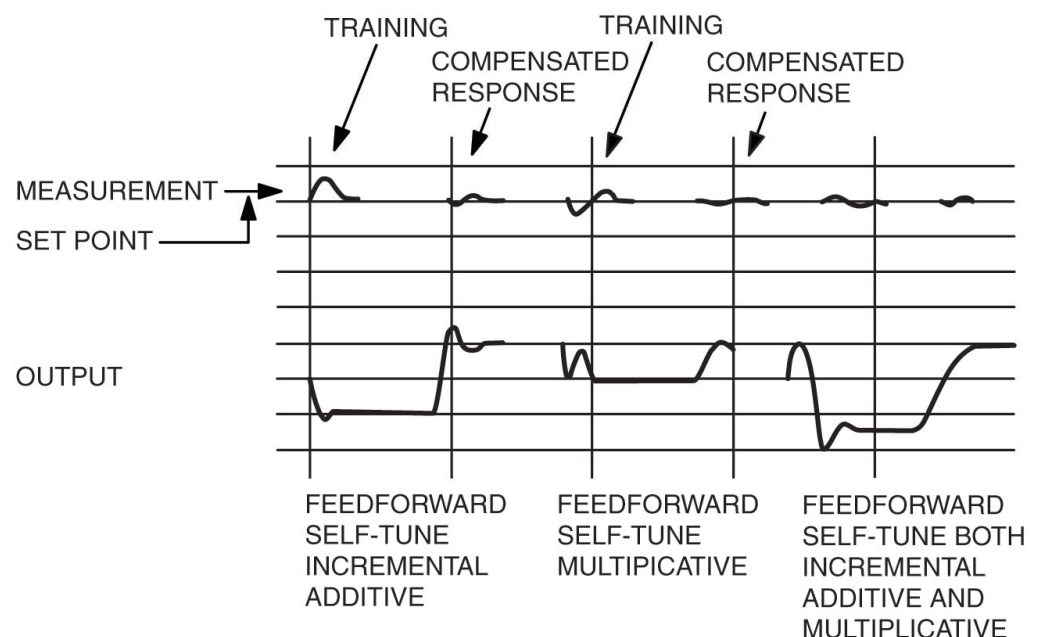
Like the feedback tuner, the feedforward tuner has six sets of stored compensator parameters for each load. Each set is associated with a subrange of a user-selected variable and an initial error-response direction.


When a new response is detected, the most appropriate tuning set is inserted into the controller and updated after the peak search. This provides an adapted gain scheduling or learning to anticipate the behavior of a nonlinear process.

Figure 1 shows FFTUNE training and compensated responses for an incremental and a multiplicative load.

FFTUNE is not available in the CP10.

Figure 1. Response of Single Loop Adaptive Multivariable Control with FFTUNE



 **WARNING:** This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov/.

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