

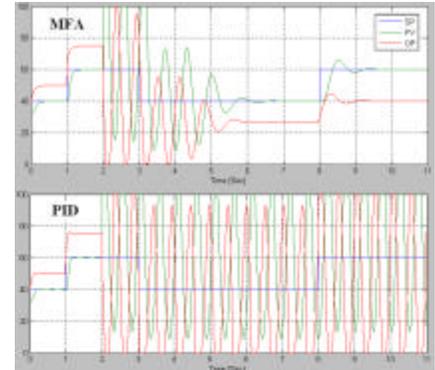
MFA Control Toolbox for MATLAB™

What's New	What's the Big Deal	What's the Benefit
Embedded MFA controllers inside MATLAB/Simulink environment as S-functions. A seamless integration.	The only simulation software for which a number of field-proven, real-time control products of the same family are available.	Run simulation first to prove the concept and then implement with ease. Reduces R&D cost, risks, and time to market.



Left: MFA Control Toolbox for MATLAB software: a 2x2 MFA controller Sfunction controls a 2x2 distillation column model.

Right: When MFA (top) and PID (bottom) start from the same oscillating condition, PID oscillates continually while MFA quickly adapts to an excellent control condition. When SP is changed, no oscillation is seen.



Model-Free Adaptive Control

MFA controls the processes that are too difficult for PID controllers to handle. MFA is the only “No Model” advanced controller on the market that can control complex systems without the use of first-principle mathematical models or dynamic modeling based models. Once installed, no controller parameter tuning is required.

Better control means improved process stability, higher production efficiency and yield, consistent product quality, and reduced material and energy waste.

MFA Toolbox – Standard Edition

Includes 6 standard MFA controllers:

- SISO MFA to replace PID to eliminate manual tuning,
- Nonlinear MFA to control extremely nonlinear processes,
- Anti-delay MFA to control processes with large time delays,
- MFA pH to control pH processes,
- Robust MFA to force PV to stay within defined bounds, and
- Feedforward MFA to compensate for measurable disturbances.

Note: Included in the Pro Edition.

MFA Toolbox – Professional Edition

Includes more special MFA controllers:

- Flex-phase MFA to control open-loop oscillating processes,
- Anti-inverse MFA to control processes that change signs,
- MIMO (2x2, 3x3, 4x4) MFA to control multi-input-multi-output processes,
- Anti-delay MFA pH controller for pH process with large time delays,
- MFA XRT for exothermal reactors,
- Time-varying MFA for time-varying processes, and
- More controllers & process models.

The Inside of Model-Free Adaptive (MFA) Control

MFA Features	MFA Inside Story	Key Points	Description
Controls complex systems		Adaptive	Adaptive weighting factors are updated in every sample interval to minimize $e(t)$.
Requires no precise process knowledge		Robust	Provides a wider robust range than PID and many other controllers.
Requires no process identification		Speed	No time consuming model training; controls process immediately.
Requires no controller design		Stability	Guarantees closed-loop stability for passive processes.
Requires no complicated manual tuning		Ease of Use	Easy to configure, launch, and maintain.