News Release

CyboSoft Releases MFA Control Solution for Exothermal Reactors

March 5, 2025 – CyboSoft (Rancho Cordova, California), the developer of Model-Free Adaptive (MFA) control technology and products, announced today that it has released a Model-Free Adaptive (MFA) Control Solution for controlling exothermal reactors.

Polymer reactors are major operating units that produce materials such as plastics, adhesives, and coatings. Most reactor temperature loops are either poorly controlled with PID or in manual control, resulting in significant temperature fluctuations, inefficient reactions, and potential safety hazards.

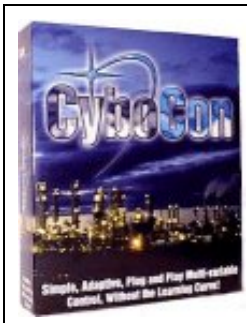
CyboSoft CEO Dr. George Cheng stated, "In an exothermal reactor, higher temperatures accelerate the chemical reaction, generating more heat and driving the temperature even higher. This chain reaction can lead to a 'runaway' process, which poses serious safety risks if not properly controlled. CyboSoft has developed a special MFA XRT controller that can effectively control this runaway process. Our MFA Control Solution for Exothermal Reactors can have a significant impact on the chemical industry, helping users achieve safer operations, higher product quality, and increased yield."

Typically, a non-self-regulating or runaway process like this could potentially be controlled using a high-gain P-controller. However, when the process also has a large time delay, controlling it becomes extremely difficult. A runaway process requires rapid control action in order to quickly reach a new balance point, while a process with a large time delay requires a more patient control action. These two control requirements are in conflict.

The MFA XRT controller overcomes these challenges by providing a "smart" control signal. Its performance is demonstrated and compared with a PID controller in a real-time simulation system using high-speed CyboCon MFA control software. As shown in the control trends above, the MFA XRT controller (top) effectively controls this delayed runaway process with quick and smart actions, forcing the system to reach a dynamic balance. In contrast, the PID controller (bottom) fails to control the process, regardless of how it is tuned. The trends show that the Setpoint (Blue) was changed from 920°C to 830°C for both MFA and PID. The MFA Controller Output (Red) made quick control moves forcing the Process Variable (Green) to track the Setpoint. The PID system remains out of control.

In a real chemical plant, the temperature setpoint of a reactor is often set lower than a desirable value to prevent a potential runaway condition. This means the efficiency of the chemical reaction is sacrificed, resulting in lower yield. With effective and robust control of the reactor temperature and pressure using MFA controllers, the temperature setpoint can be safely increased, leading to safer operations, higher product quality, and increased yield. The MFA reactor control solution has been deployed in a number of plants. Customers have achieved substantial technical and economical benefits.

The MFA Control Solution can be implemented using CyboCon MFA Control Software running on an industrial PC. For example, CyboCon can run on a Rockwell Compute Module, seamlessly integrated as part of the ControlLogix PAC system. The MFA control system running in a PC can also interface to an existing DCS through OPC or Modbus TCP, making the system integration easy.



About CyboSoft

CyboSoft is the leader in control technology serving the worldwide process control, building control, and equipment control markets. CyboSoft's patented Model-Free Adaptive (MFA) control technology for automatically controlling physical processes is a major breakthrough. No other comparable technology possesses all the attributes of MFA. CyboSoft received the 2007 Frost & Sullivan "North America Technology Leadership Award" in the field of Industrial Automation. MFA is the only commercially successful smart controller that does not require mathematical models.

For more information or to request for an MFA XRT Control Demo, please contact: CyboSoft, e-mail: Josh Bear, JBear@cybosoft.com. Website: www.cybosoft.com.