AptiTune™

MULTIVARIABLE PID TUNING AT THE TOUCH OF A BUTTON

DISCOVER

AptiTune allows DCS technicians and process control engineers to tune single PID loops or multiple interacting PID loops, achieving exceptional control loop performance with little or no need for iteration. In 90% of cases, "one-shot" tuning can be achieved and the loops will work as predicted by the software.

THE APTITUNE EXPERIENCE

Mild Learning Curve: AptiTune is easy to learn and easy to use. A tuning wizard is available to guide the user through the workflow steps so that PID loops can be tuned without a detailed knowledge of the software.

Usability: The AptiTune user interface clearly shows where engineering decisions are required while detailed visual analysis tools help the user understand the effect of any design decisions on PID loop performance and robustness.

A Reliable way to Tune PID loops that "Fight" each other: For the first time, control engineers can simultaneously optimize the tuning of multiple PID loops that interact with each other in an undesirable way. Not only do controller oscillations go away for good, it is often possible to improve both the performance and the robustness of the loop without the cycling reappearing.

Productivity Improvements: The software executes rapidly and new tuning can be derived in just a few minutes once the required model has been provided. In addition, the tuning can be entered on the DCS as calculated usually with no need for further changes. For single loop applications, it is not necessary to use model identification software as the model can be calculated from entering 2 to 3 process values from the step response.

Tuning that is Robust: Models of moderate accuracy can be used to help reduce the time spent step testing the process. AptiTune calculated tuning can often withstand significant changes in the dynamics of the process without going unstable.

Handles Large Problems: Up to 15 PID loops can be tuned at the same time. A 15 loop example converges in about 10 minutes while a 3 loop example converges in less than 30 seconds.

Works on any DCS: The control engineer supplies the OP and PV ranges for the PID loops and picks the desired PID equations from a wide range of vendor PID algorithms and the controller type (P, PI, PID, or I-only).

Calculated Defaults that Work: The default tuning specifications will provide PID constants that work well first time. If we have specific process objectives in mind, like improved response to disturbances, the control engineer can inspect the simulated OP and PV responses and adjust the specifications to obtain the desired response.

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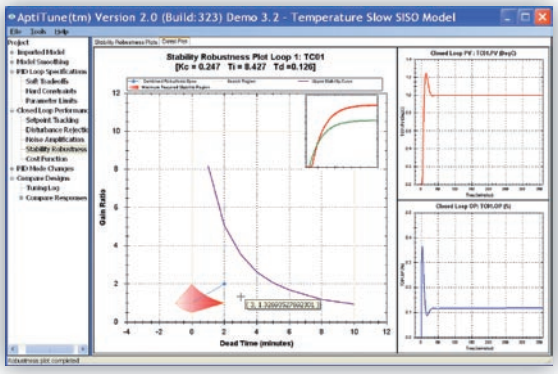
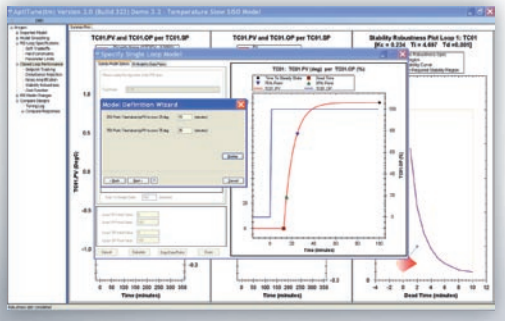
APTITUNE CAPABILITIES:



APTITUNE WIZARD AT WORK

Based on customer feedback, AptiTune™ has been extended. Version 2.0 makes it easier for non-specialists to use the package. Our aim has been to extend AptiTune so that process engineers and DCS technicians can also use it. The learning curve is substantially shorter since the wizard allows a first time user to tune PID loops without learning any technical jargon. For single loop applications, there is no need to learn a stand-alone model identification package since a small number of experimental data points can be used to identify a response model from a single step.



Process Realism

The user entered open loop response model is smoothed by fitting a high order state space model with explicit dead time. The state space model will be very smooth and represents a high degree of process realism. Using this approach ensures we get reliable tuning, even if the supplied model was generated from a relatively short data set.

Tuning that Takes Equipment Constraints into Account

It is straightforward to achieve closed loop behaviour that is precisely tailored to the specific requirements of the process. The software does not use simplistic tuning rules, but rather uses a state space model of the process, DCS specific PID equations and a non-linear optimizer to achieve the best possible trade-off between competing design objectives such as setpoint tracking and disturbance rejection while dealing with dynamic interactions between the loops. The user has full control over how to balance these trade-offs.

Detailed Control Design Objectives

The user can limit process variable (PV) overshoot to a setpoint response as well as put limits on the output movement for a specified setpoint change. A loop can be made faster at the expense of another loop or the disturbance rejection can be improved at the expense of the setpoint tracking response. In addition the user can explicitly specify the maximum noise level in the output for a specific amount of noise in the PV. This can be especially useful for tuning fired heater draft pressure controls.

One-Shot Tuning

What is most impressive about the software is that in the majority of applications it delivers "one-shot tuning". The user works within the safe environment of his or her PC, where the optimizer can try out several thousand options in a matter of seconds. With a reasonably accurate open loop response model, the new calculated tuning on all of the control loops can be entered at the same time and will work as predicted. To confirm this, the user can make a setpoint change on the live system and observe the response and compare to what was predicted on AptiTune. This approach can save days or weeks of engineering effort, while significantly improving the overall process performance.

In order to download the demo version of AptiTune, type the following link in your internet navigator and follow the instructions.

http://aptitude.ipcos.be/en/downloads/products

Loop Stability despite Changes in the Process

By specifying the expected worst case changes in process gain and dead time, AptiTune uses a robust approach to ensure all of the interacting loops will be stable in the long term. This feature provides protection against model errors and ensures that a moderately accurate model is adequate for tuning purposes. Nonetheless, the user should remember that accurate open loop models will always result in the best performance.

IPCOS aptitude

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