PITOPS-TFI
Transfer Function Models

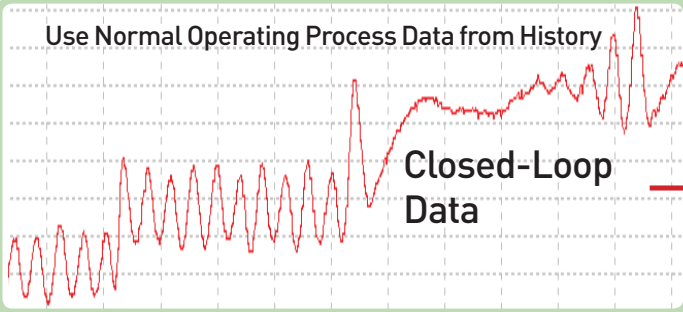**πPiControl Solutions**

PITOPS-TFI software reads process data from any DCS/PLC data historian and **develops dynamic models** (transfer functions). These models **help to improve** plant efficiency and **increase** plant profits.

Use Normal Operating Process Data from History

Closed-Loop Data

Identify Open-Loop Transfer Functions (Dynamic Models)

Zero Order

First Order

Second Order

Open Loop Unstable

**New Algorithm!
New Technology!
Breakthrough Invention!**

PITOPS-TFI is the only software in the world that can successfully **identify transfer function models** using **complete closed-loop data** without intrusive step tests, even in the **presence of noise** and **unmeasured disturbances**.

Superior to ARMAX/Box-Jenkins and other methods!

System identification is a complex area but **PITOPS** makes it simple. **PITOPS** works in **time domain**, so no complicated math is needed. No need for Laplace domain! In just 5 clicks, you **can identify transfer function dynamic models** even **with multiple inputs**.
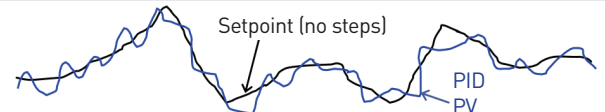
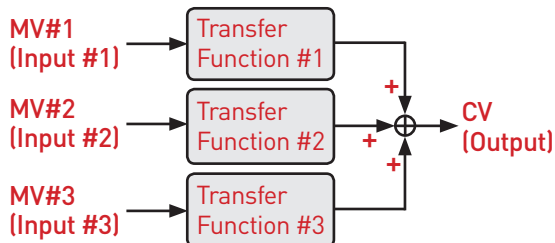Competitor software needs step tests on PID OP in manual mode

PID Output

Or, competitor software needs step tests on Setpoint in Auto mode

Setpoint
PID PV

Only **PITOPS** can identify transfer functions without any step tests

Setpoint (no steps)

PID PV

Multi-input Closed-Loop Identification

MV#1 (Input #1) → Transfer Function #1
MV#2 (Input #2) → Transfer Function #2
MV#3 (Input #3) → Transfer Function #3
→ CV (Output)

PITOPS-TFI can be used to **improve MPC Performance**. It can help to improve DMC/RMPCT Models **using Closed-Loop** data with the controller active. **PITOPS** is the only tool in the market for MPC maintenance, **offering a novel**, **new** and **unmatched method**.

PITOPS Transfer Function Model Value:
- **Optimize** PID tuning parameters
- **Implement** Advanced Process Control
- **Improve** MPC quality (DMC/RMPCT)
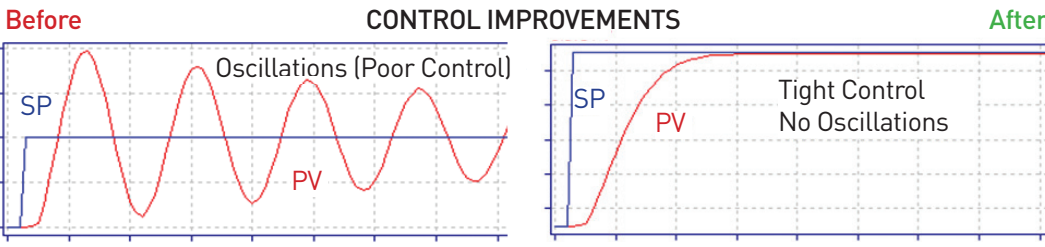- Process **Troubleshooting** and **Analysis**

PITOPS-TFI needs less data compared to all competitor technologies. It **works with fast processes** in milli/micro seconds timeframe and with **very slow processes** settling in several hours. **PITOPS** is a practical, handy tool designed to **benefit** both **industrial control rooms** and also **colleges, universities**. The ability to analyze plant data or research data in just minutes opens various new amazing opportunities for process control scheme development, **improving PID tuning** and **developing APC** (advanced process control). **The APC can be designed and implemented inside the plant's existing DCS or even PLC using dynamic models developed using PITOPS.**

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PITOPS-PID
PID Optimizer & Advanced Control

π PiControl Solutions

PITOPS-PID is PID and APC tuning simulation and optimization software. **PITOPS** improves PID control; it reduces oscillations and speeds up sluggish control. It can be used to design and implement APC (advanced process control) inside a plant's DCS or PLC. **PITOPS-PID** is the only software you will need inside the control room for PID control improvements and APC design and maintenance. **PITOPS** is also useful in colleges and universities for teaching semester courses and for process control research.

CONTROL IMPROVEMENTS

Before — Oscillations (Poor Control) — SP — PV
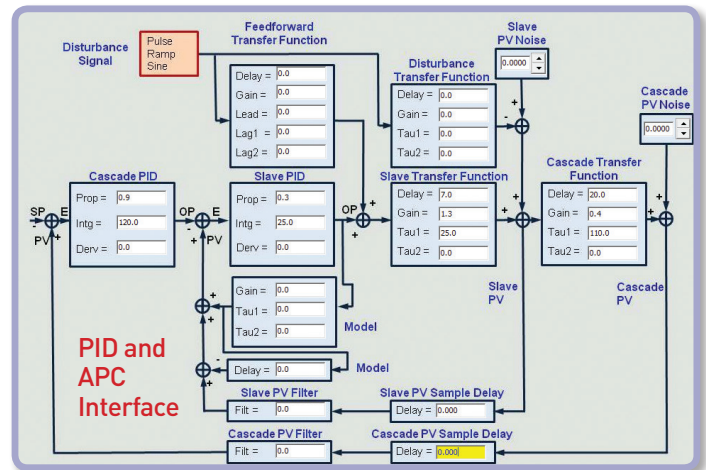
After — Tight Control, No Oscillations — SP — PV

PITOPS has saved many plants anywhere from $50K to $2 million by way of improved PID control quality and APC installed inside the plant's DCS!!!

Superior to all known methods – superior to IMC (Internal Model Control), Lambda, Ziegler-Nichols, Cohen-Coon etc.

New Algorithm! Novel Breakthrough Technology!

PITOPS-PID has been used in numerous plants and universities worldwide. It has been used in chemical, petrochemical, polymer, electric power, paper, oil-refining and many other industrial manufacturing plants worldwide. **PITOPS-PID** tuning optimization is not based on heuristics and rules like in IMC, Lambda etc. but **PITOPS** optimizes PID tuning and APC parameters for a custom simulation matching exactly the real process inside the real plant DCS. You configure typical setpoint changes, typical noise and disturbances as seen in the real DCS PID trends and then **PITOPS** optimizes PID tuning and APC parameters for that custom simulation exactly matching your real control loop and process dynamics. **This functionality is a real breakthrough and a major invention and produces results superior to any competitor technology.**

PID and APC Interface

FUNCTIONS:
- Single/Slave PID
- Cascade PID
- Feedforward
- Ratio Control

- Model-based control
- Dead-time compensation
- Constraint Override
- Control valve stiction
- Nonlinear control

Feedforward Control

Low Signal Selector

Constraint Override Control

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