Tuning and Loop Performance – Default Setting

	Gain	Reset	Rate
Flow	0.3	5	--
Temperature	1.3	300	60
Level	2	600	--
Gas Pressure	3	600	--

Figure 12-1. Initial PID Tuning

Manual Tuning Technique

Tuning of a PI controller applied to a self-regulating process can be quickly establish as follows:

1. Place the controlled and manipulated parameters on trend.
2. Place the controller in manual and allow the process to reach steady state.
3. Impose a step change in OUT and observe the response.
4. Set the RESET to match the sum of the process deadtime plus the time constant.
5. Place the loop on automatic control using conservative GAIN.
6. Make small changes in Setpoint and observe the response. Adjust only the GAIN to achieve the desired response.

Figure 12-2. Manual Tuning Technique

Tools to Automate Tuning

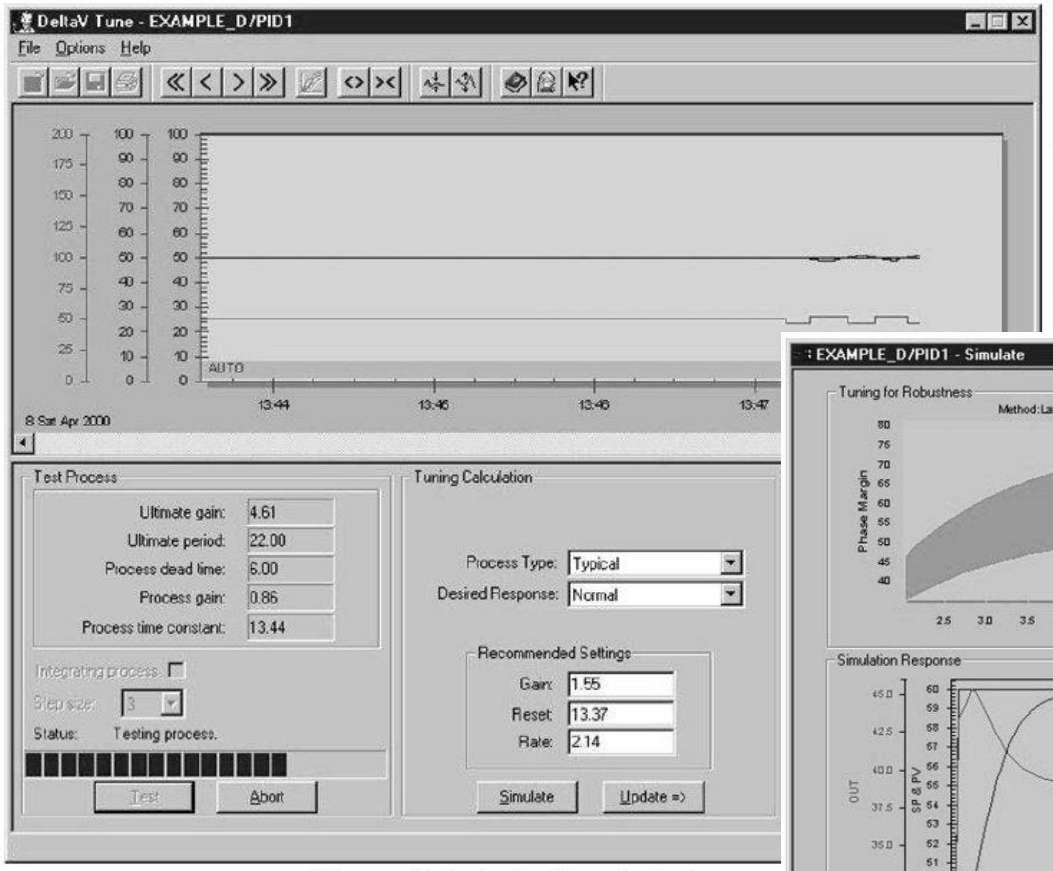


Figure 12-3. Auto-Tune Interface

- Example base on DeltaV Insight On-demand Tuning

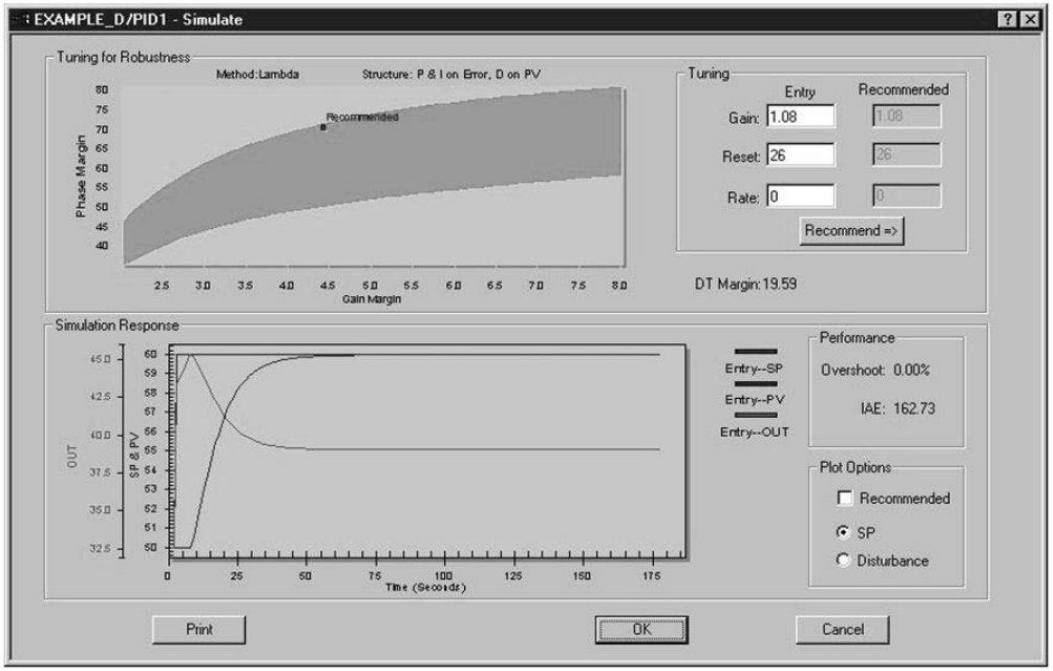


Figure 12-4. Simulation of Loop Response

Impact of Sticky Valve

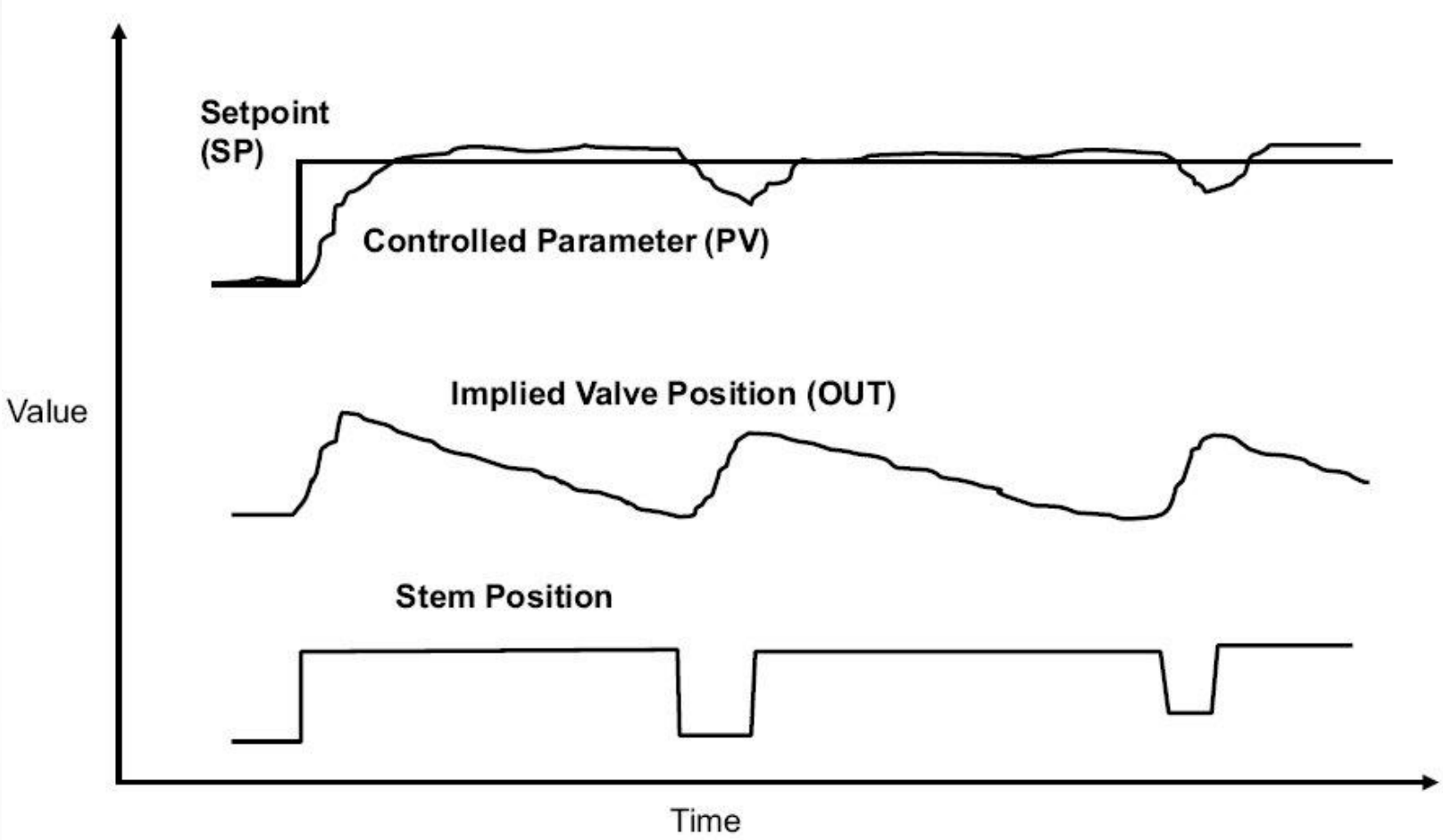


Figure 12-5. Impact of Sticky Valve on Automatic Control

Use of Signal Characterizer to Compensate for Non-linearity

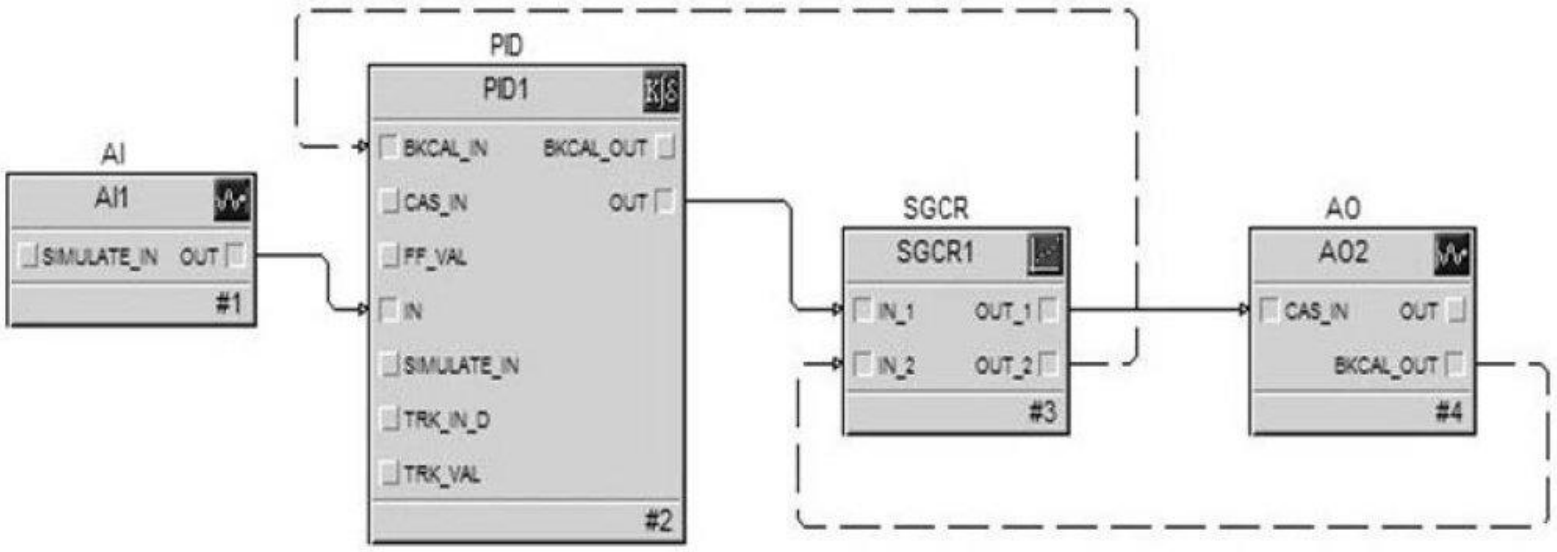
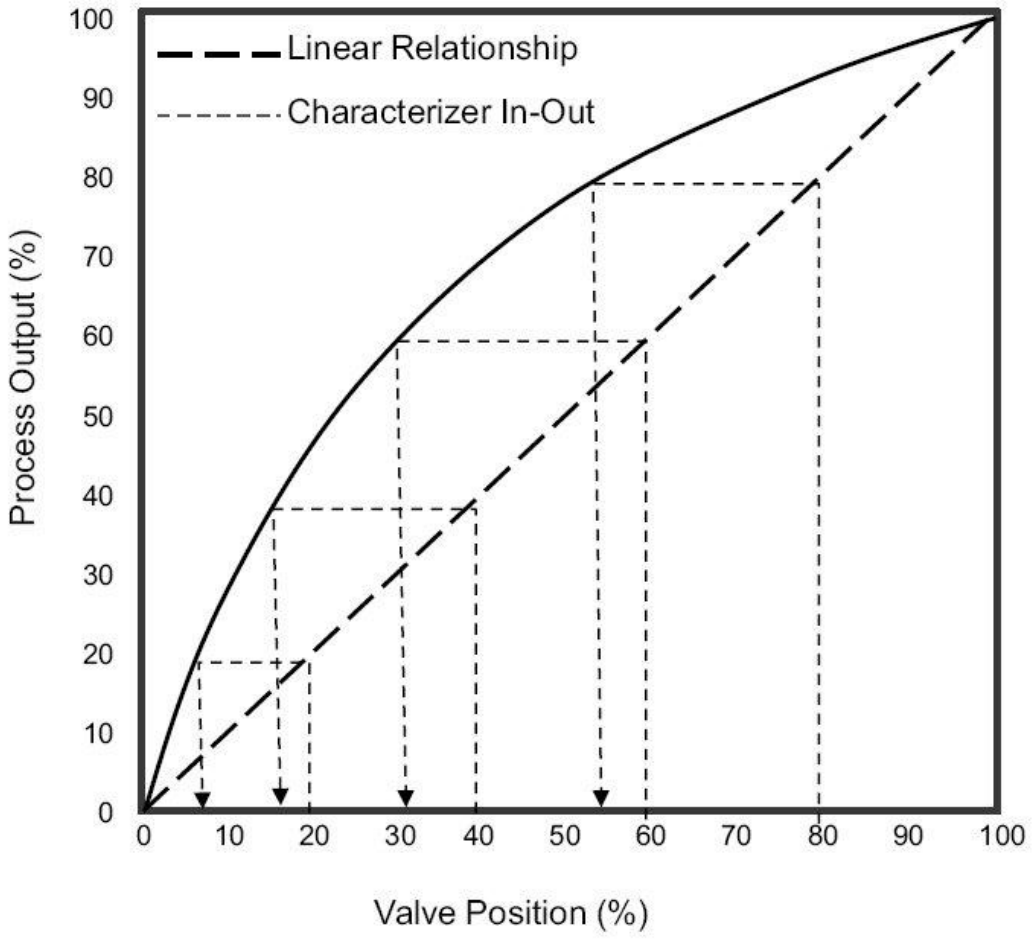


Figure 12-7. Signal Characterization in Control Path

Characterizer Setup



Characterizer IN	OUT
0	0
5	1.5
10	3
15	5.5
20	8,5
25	10
30	11.5
35	13
40	17
45	20
50	22
55	26
60	31
65	36
70	42
75	48
80	54
85	63
90	74
95	86
100	100

Figure 12-8. Example of Characterizer Setup