NOMENCLATURE

a  Constant
A(h)  Area of cross section of tank at level h
ADC/DAC  Analog to Digital Converter/Digital to Analog Converter
b  Constant
C  Outflow valve coefficient
C(s)  Output of process
D(s)  Disturbance
DCS  Double Controller Scheme
DCSVM  Double control scheme with variable model
e(k)  Error at kth sampling instant
E(s)  Error
FGS  Fuzzy Gain Scheduling
F in  Inflow rate
F nn  Nominal inflow rate
FLC  Fuzzy Logic Controller
FOPDT  First Order Plus Dead Time
F out  Outflow rate
FPI  Fuzzy logic PI controller
g(.)  Variable transformation
g'(.)  Inverse variable transformation
Gc or Gc(s)  Controller transfer function
GLC  Globally Linearized Controller
Gm  Smith feed back transfer function
$G_p$ Process transfer function
$G_{p1}$ First controller in DCS
$G_{p2}$ Second controller in DCS
$G^*$ Dead time free process model
GS Gain Scheduling
GSVM Gain scheduling with variable model
H Total height of the tank
H(s) Output of level process
h(t) Level or output at time t
$h_n$ Nominal level
IAE Integral Absolute Error
IMC Internal Model Control
ISE Integral Square Error
ITSE Integral Time Square Error
$K_c$ Propositional gain of the controller
$K_c,\text{ max}$ Maximum controller gain
$K_c,\text{ min}$ Minimum controller gain
$K_d$ Derivative gain of the controller
$K_i$ Integral gain of the controller
$K_p$ Process gain
$K_u$ Ultimate gain of the proportional controller
$l_m$ Approximate dead time used in $G_{p2}$
$l_s$ Another dead time used in $G_{p2}$
MFGS Model based Fuzzy Gain scheduling
MSP Modified Smith Predictor
MSPI Modified Smith PI controller
NB Negative Big
NM, NMPC, NS, PB, PI, PM, PS, PV, q(-), R, R, R(s), S. No., SOPDT, SP, Td, Td/Tp, Tdm, Ti, max, T,, min, TP, Tu, U, U(s), v, V

Negative Medium
Nonlinear Model Predictive Control
Negative Small
Positive Big
Proportional plus Integral controller
Positive Medium
Positive Small
Process variable
Controller output transformation
Radius of the liquid top
Top radius of the tank
Reference signal
Serial Number
Second Order Plus Dead Time
Set Point
Dead Time
Ratio between dead time and process time constant
Estimated dead time
Integral time
Maximum integral time
Minimum integral time
Time constant of the process
Ultimate period of the proportional controller
Change in inflow rate
Input variable in Laplace domain
Controller output in the transformed domain
Volume of tank
VTP  Variable Transformation Predictor
x*  Reference or set point
Y(s) Output variable in Laplace domain
y'  Derivative of y, the output variable
z*  Reference or set point in the transformed domain
ZN-PI Conventional Ziegler and Nichols PI
α  Weighting factor
Δe(k) Change in error at k\textsuperscript{th} sampling instant