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KEY WORDS: *Falling film evaporator, Nonlinear model, Fuzzy controller, Conventional feedback controller, Cascade controller.*

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+E-mail:farsi@shirazu.ac.ir

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() Steam economy

Lepage Tade

Tade Kam .[]

Van Wijck .[]

Lahtinen .[]

Lozano .[]

Elastondo

Cadet .[]

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Rangaia .[]

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Huub .[]

Ritter Andre .

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Fisher Newell .

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Lampinen Haj Assad .[]

PID

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Spikins Kropholler

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Marsh Winchester .

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(¹) (FIS)

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$$\frac{d(m_i H_i)}{dt} = m_{L,i-1} H_{L,i-1} - m_{L,i} H_{L,i} - m_{V,i} H_{V,i} + Q_i \quad (1)$$

$$Q_i = A_i U_i (T_{i-1} - T_i) = m_{V,i-1} (H_{V,i-1} - H_{C,i-1}) \quad (2)$$

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$$\left(\frac{dm_i}{dt} = 0 \right)$$

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$$m_{V,i} = K_{V,i} m_{V,i-1} \quad (3)$$

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$$H_L = (4186 - 3188/2.0 \times C) \times T + 0.6484 \times C \times T^2 \quad (4)$$

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$$H_V = 1.00 \times (25.3/1 + 1.7541 \times T) \quad (5)$$

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$$H_C = 4186 \times T \quad (6)$$

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$$\rho_F V_{P,i} \frac{dH_{F,i}}{dt} = m_F H_{F,i-1} - m_F H_{F,i} + Q_{P,i} \quad (7)$$

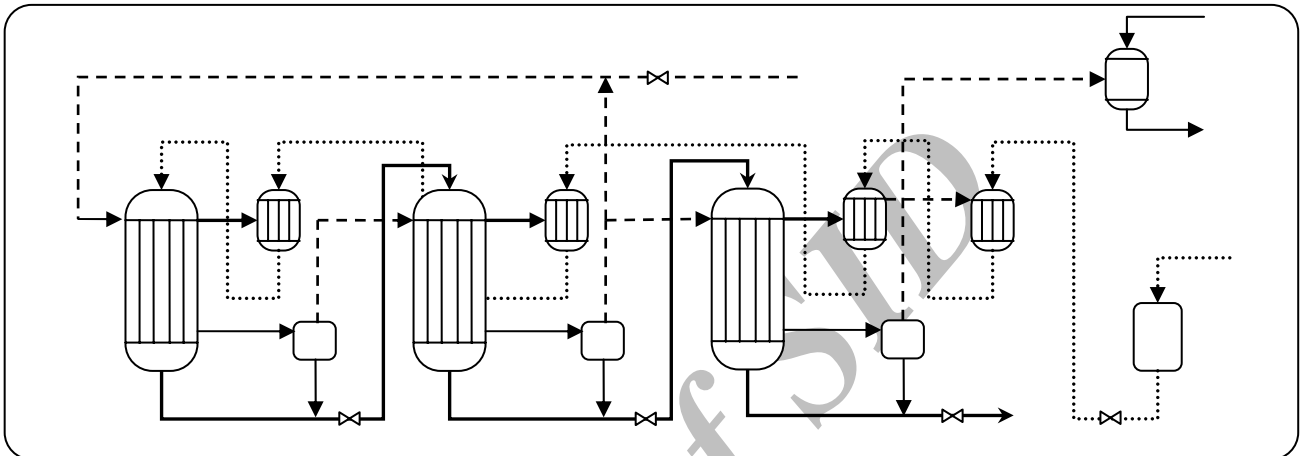
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$$\frac{dm_i}{dt} = m_{L,i-1} - m_{L,i} - m_{V,i} \quad (8)$$

$$\frac{d(C_i m_i)}{dt} = C_{i-1} m_{L,i-1} - C_i m_{L,i} \quad (9)$$

(kg solid/kg milk)	(kg/h)	(W/m ² K)	(°C)	
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$$(m_{S-Live} + m'_{Vr}) \times H_S = \quad (1)$$

$$m_{S-live} \times H_{S-Live} + m'_{Vr} \times H_{Vr}$$

() (ANFIS)

() (BP)

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() Backpropagation

() Artificial Neuro-Fuzzy Inference System

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K_c	τ_I	
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/	/	/	IAE
/	/	/	
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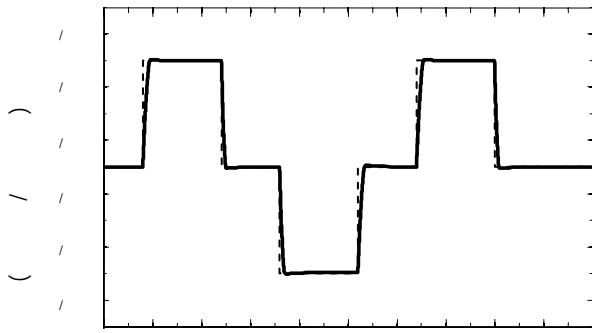
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PI

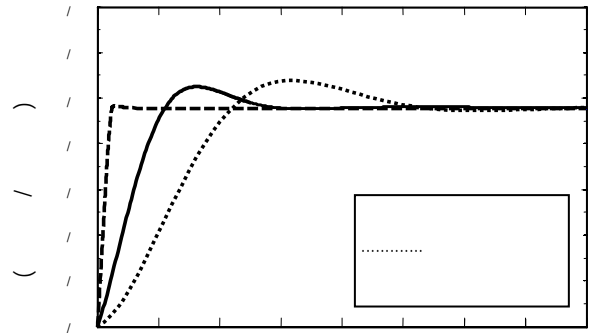
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Architect

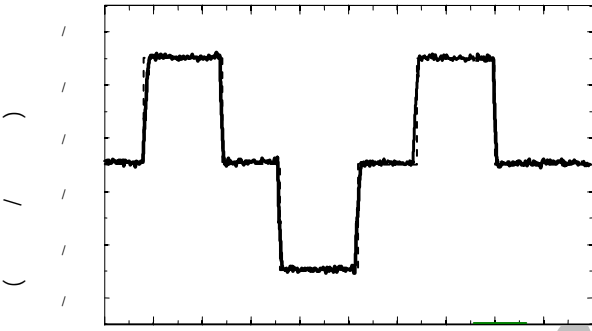
() Membership Function



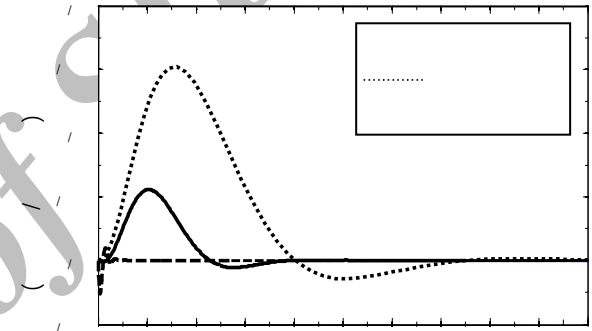
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