



تحليل نظري عملکرد کوردهای آبی... / مهدی علی احسانی و ...

شماره انرژی ایران

سال هشتم / شماره ۸۷ / اردیبهشت ۱۳۸۲

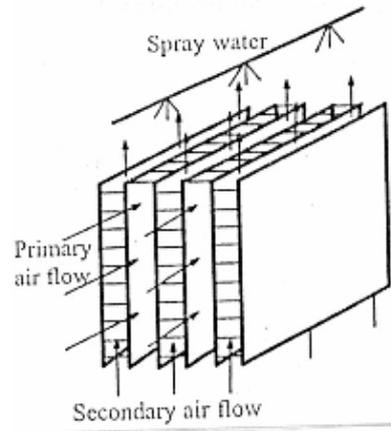
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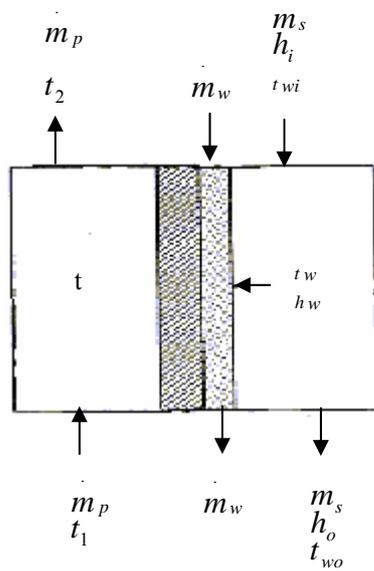
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Le=1

$\epsilon - NTU$

$$U_0(t - t_w) - m_p c_p dt \quad ()$$

$$(NTU)_p = \frac{U_0 A}{m_p c_p} = -\ln\left(\frac{t_2 - t_1}{t_1 - t_w}\right) \quad ()$$

$$\epsilon_p = 1 - \exp(NTU)_p = \frac{t_1 - t_2}{t_1 - t_w} \quad ()$$

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$$h_D(h_w - h)dA = \dot{m}_s dh \quad ()$$

$$(NTU)_s = \frac{h_D A}{\dot{m}_s} = \frac{h_D c_p A}{\dot{m}_s c_p} = -\ln\left(\frac{h_0 - h_w}{h_0 - h_i}\right) \quad ()$$

$$\varepsilon_s = 1 - \exp(-NTU)_s = \frac{h_i - h_0}{h_i - h_w} \quad ()$$

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$$C_{wb} = \frac{h_o - h_i}{t_{w_o} - t_{w_i}} \quad ()$$

 C_{wb}

$$\varepsilon_s = 1 - \exp(-NTU)_s = \frac{t_{w_i} - t_{w_o}}{t_{w_i} - t_w} \quad ()$$

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$$Le^{2/3} = \frac{h_c}{h_D c_p} \Rightarrow h_c = c_p h_D \quad ()$$

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$$(NTU)_s = \frac{h_c A}{\dot{m}_s c_p} = -\ln\left(\frac{t_{w_o} - t_w}{t_{w_i} - t_w}\right) \quad ()$$

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$$\varepsilon_c = \frac{t_1 - t_2}{t_1 - t_{w_i}} \quad ()$$

$$\dot{m}_p c_p (t_1 - t_2) = \dot{m}_s (h_o - h_i) \quad ()$$

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$$t_2 = t_1 - \frac{C_{\max}}{C_{\min}} (t_{w_o} - t_{w_i}) \quad ()$$

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$$C_{\min} = \dot{m}_p C_p \quad ()$$

$$C_{\max} = \dot{m}_s C_{wb} \quad ()$$

$$\varepsilon_p = \frac{C_{\max}}{C_{\min}} \left(\frac{t_{wo} - t_{wi}}{t_1 - t_w} \right) \quad ()$$

$$t_w = \frac{\varepsilon_s \left(\frac{C_{\max}}{C_{\min}} \right) t_{wi} + \varepsilon_p + 1}{\varepsilon_s \left(\frac{C_{\max}}{C_{\min}} \right) + \varepsilon_p} \quad ()$$

$$\varepsilon_c = \frac{1}{\frac{1}{\varepsilon_p} + \frac{1}{\varepsilon_s} \left(\frac{\dot{m}_p c_p}{\dot{m}_s c_{wb}} \right)} \quad ()$$

$$Nu = 0.023 Re_{D_h}^{4/5} Pr^{1/2} \quad Re > 2300 \quad ()$$

$$Nu = 7.54 \quad Re \leq 2300 \quad ()$$

$$Re_{D_h} = \frac{4\dot{m}}{\pi D \mu}, \quad D_h = 2b$$

$$\Delta P_f = f \frac{L}{D_h} \frac{V^2 \rho}{2} \quad ()$$

$$\Delta P_l = \sum k \frac{\rho V^2}{2} \quad ()$$

$$\Delta P_t = \Delta P_f + \Delta P_l \quad ()$$

$$\eta_m = 1 \quad ()$$

$$W = \frac{\dot{m}_p \Delta P_p}{\eta_p} + \frac{\dot{m}_s \Delta P_s}{\eta_s} \quad ()$$

$$\text{EER} = \frac{Q_C}{W} \quad ()$$

$$Q_C = \dot{m}_p c_p (t_1 - t_2) \quad ()$$

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$$(e_{t,p})_{in} = R_a t_1 \ln(1 + 1.6\omega_o) \quad ()$$

$$e_{t,p)_{out} = c_p t_o \left(\frac{t_2}{t_o} - 1 - \ln \frac{t_2}{t_o} \right) + R_a t_o \ln \left(1 - \frac{\Delta P}{P_o} \right) + R_a t_o \ln(1 + 1.6\omega_o) \quad ()$$

$$e_{t,s)_{in} = (c_p + \omega c_{pv}) t_o \left(\frac{tw_i}{t_o} - 1 - \ln \frac{tw_i}{t_o} \right) + (1 + 1.6\omega_o) R_a t_o \ln \frac{P}{P_o} + R_a t_o \left[(1 + 1.6\omega_o) \times \ln \frac{1 + 1.6\omega_o}{1 + 1.6\omega} + 1.6\omega_o \ln \frac{\omega}{\omega_o} \right] \quad ()$$

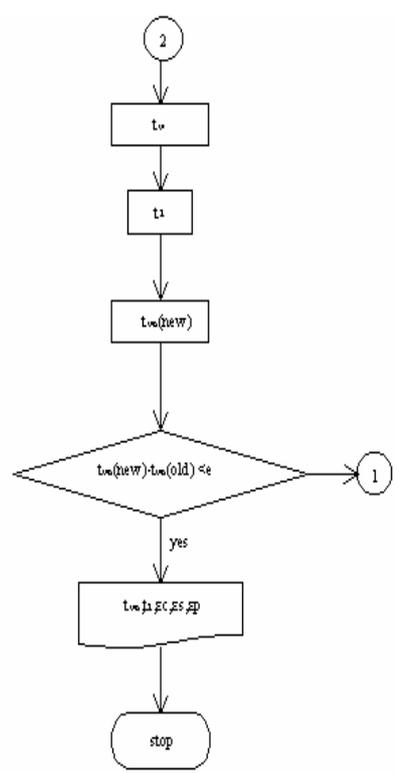
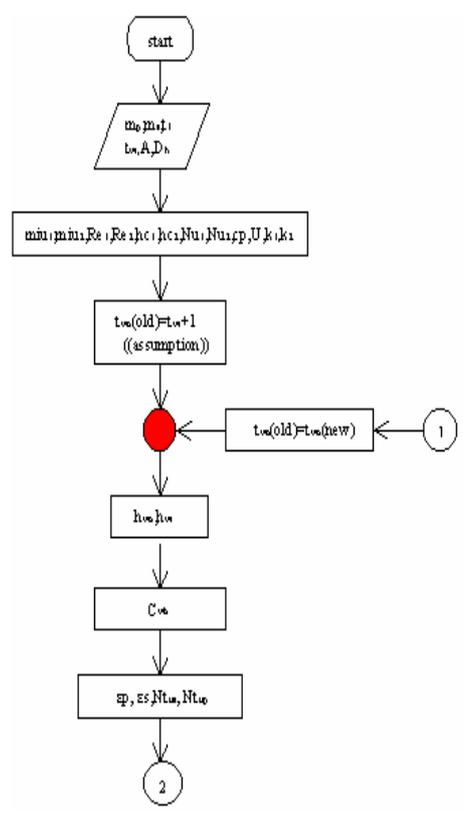
$$e_{t,s)_{out} = (c_p + \omega_{out} c_{p,v}) t_o \left[\frac{tw_o}{t_o} - 1 - \ln \frac{tw_o}{t_o} \right] + (1 + 1.6\omega_{out}) R_a t_o \ln \left(1 - \frac{\Delta P}{P_o} \right) + R_a t_o \left[(1 + 1.6\omega_{out}) \ln \left(\frac{1 + 1.6\omega_o}{1 + 1.6\omega_{out}} \right) + 1.6\omega_{out} \ln \frac{\omega_{out}}{\omega_o} \right] \quad ()$$

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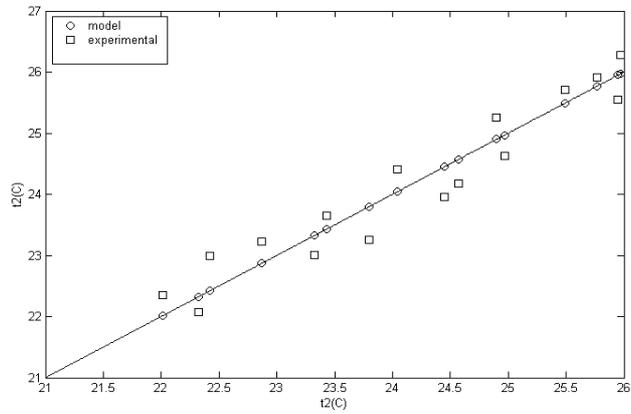
$$S_{gen} = \frac{1}{T_0} \left\{ \dot{m}_p e_{tp} + \dot{m}_s e_{ts} \Big|_{in} - \left[\dot{m}_p e_{tp} + \dot{m}_s e_{ts} \right]_{out} \right\} \quad ()$$

$$\dot{S}_{gen} = f(\dot{m}_p, \dot{m}_s, L, W) \quad ()$$

EER [] t_2 () () () () ()



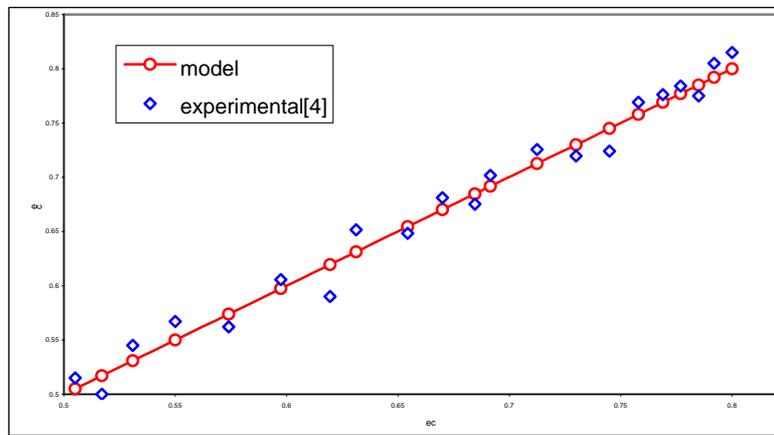
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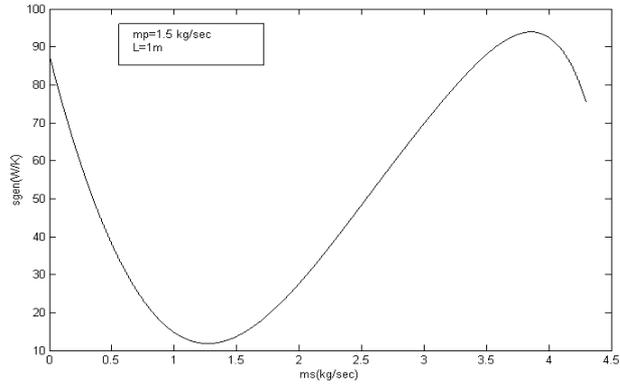
L W \dot{m}_s \dot{m}_p

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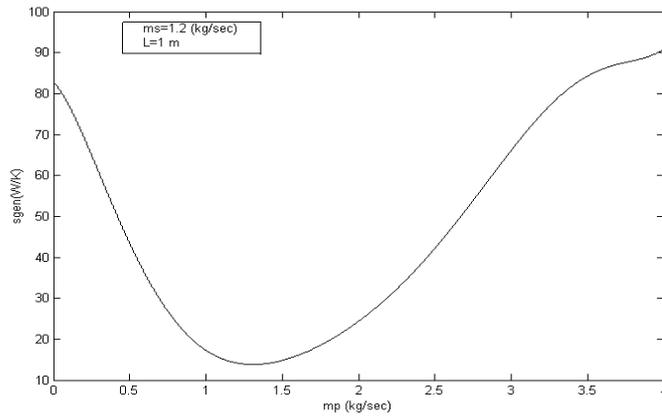


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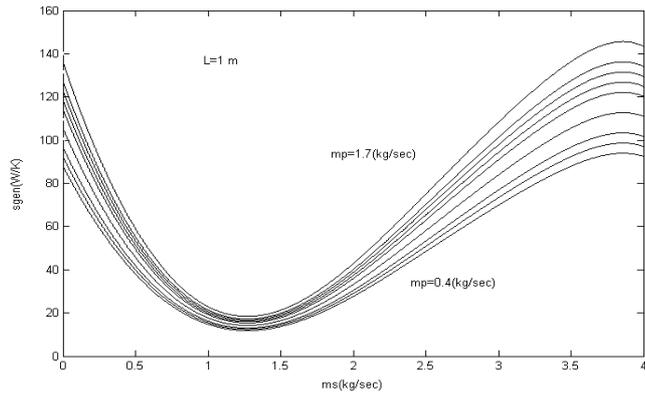
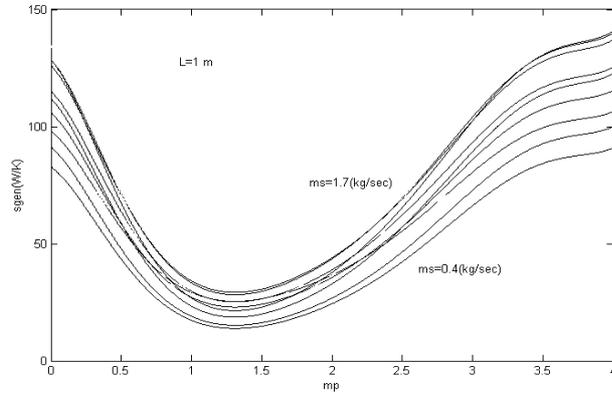


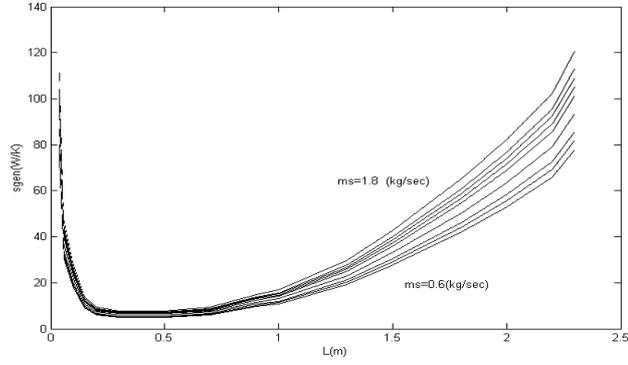
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	$\left(\frac{\text{kJ}}{\text{kg}}\right)$	h_i	$\left(\frac{\text{m}^2}{\text{m}}\right)$	A
	$\left(\frac{\text{kJ}}{\text{kg}}\right)$	h_0	$\left(\frac{\text{W}}{\text{°C}}\right)$	B
		h_w	$\left(\frac{\text{W}}{\text{°C}}\right)$	C_{max}
	$\left(\frac{\text{kJ}}{\text{kg}}\right)$	K	$\left(\frac{\text{KJ}}{\text{Kg} \text{°C}}\right)$	C_p
(m)		L	$\left(\frac{\text{KJ}}{\text{Kg} \text{°C}}\right)$	C_{pv}
	$\left(\frac{\text{kg}}{\text{sec}}\right)$	Le		D_h
	$\left(\frac{\text{kg}}{\text{sec}}\right)$	\dot{m}_a	(m)	$e_{t,p}$
	$\left(\frac{\text{kg}}{\text{sec}}\right)$	\dot{m}_p	$\left(\frac{\text{W}}{\text{KgK}}\right)$	$e_{t,s}$
	$\left(\frac{\text{kg}}{\text{sec}}\right)$	\dot{m}_s	$\left(\frac{\text{W}}{\text{KgK}}\right)$	

	\dot{m}_w		:EER
	$(NTU)_p$:f
	$(NTU)_s$	$(\frac{W}{m^2 \cdot ^\circ C})$:h _c
		$(\frac{kg}{m^2 \cdot s})$:h _D
	:U ₀	(Pa)	:Nu
$(\frac{W}{m^2 \cdot ^\circ C})$		(Pa)	:ΔP _f
		(Pa)	:ΔP _I
		(Pa)	:ΔP _p
		(Pa)	:ΔP _s
	:ε _c		:Pr
	:ε _p		:Re
	:ε _s	$(\frac{W}{kgK})$:S _{gen}
$(\frac{kg}{m^3})$:ρ	(C)	:t ₁
	:η _p	(C)	:t ₂
	:η _s	(C)	:t _{wi}
$(\frac{kg}{s^2m})$:μ	(C)	:t _{wo}
	:ω _{out}	(C)	:t _w
	:ω ₀		:t ₀

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