

Legend

Elements (14 equations)

- Processes (12 equations)

MR mixing fix-rate in mixing box (2 eq.)

CC perfect cooling coil (4 eq.)

MX mixing process in cooling coil (2 eq.)

TZ thermal zone (2 eq.) BL building (2 eq.)

- Proportional controllers (1 equations)

 K_{θ} indoor air temperature (1 eq.)

Non-linear (least squares) controller (1 equation)
Is supply air temperature (1 eq.)

Others

D controlled by-pass damper

F fan

 Ψ psychrometric function, $w = \Psi(\varphi)$

mass flow rate, temperature and moist ratio

heat flow ratemass flow rate

information flow

Unknowns (14 values.)

- Variables (13 values)

M, s, S, I air states $(\theta_k, w_k)|_{k=1..5}$ (8 vals.)

 \dot{Q}_{tCC} total heat of cooling coil (1 val.)

 \dot{Q}_{sCC} sensible heat of cooling coil (1 val.)

 \dot{Q}_{lCC} latent heat of cooling coil (1 val.)

 \dot{Q}_{STZ} sensible heat of thermal zone (1 val.)

 \dot{Q}_{lTZ} latent heat of thermal (1 val.)

- Parameter (1 values)

 β by-pass factor of the cooling coil (1 val.)

Given

- Inputs

 θ_o , φ_o outdoor air conditions

 $\theta_{\mathit{I},\mathit{sp}},\; \varphi_{\mathit{I},\mathit{sp}} \quad \text{indoor air conditions set-points} \\ \dot{m}_o \qquad \qquad \text{mass flow rate of outdoor air}$

- Parameters

 \dot{m} mass flow rate of supply air

 K_{θ} proportional controller gains