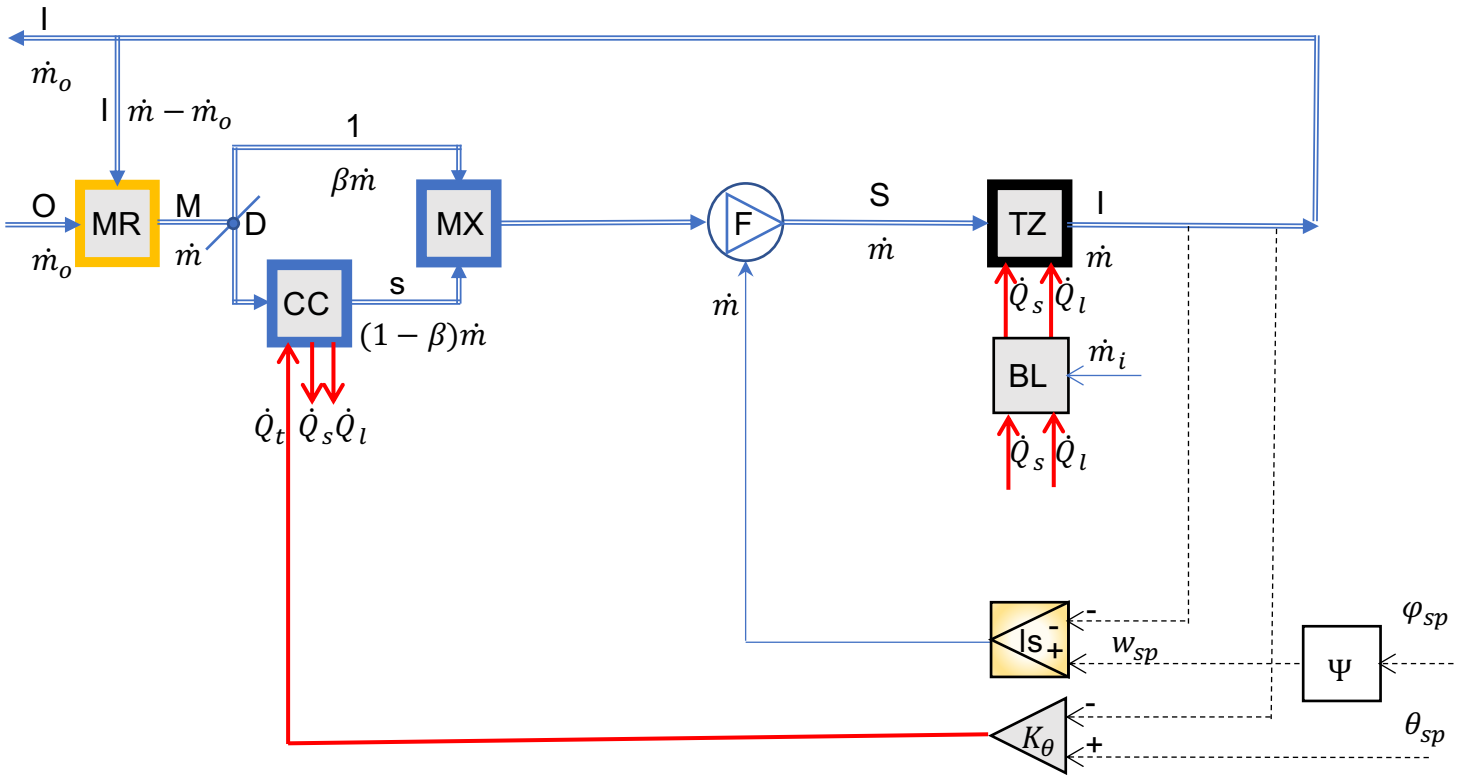

Legend

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)*

ls	supply air temperature (1 eq.)

Others

D	fixed by-pass damper
F	fan
Ψ	psychrometric function, $w = \Psi(\varphi)$
⟹	mass flow rate, temperature and moist ratio
→	heat flow rate
⇒	mass 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)*

$\dot{m}$	mass flow rate of supply air (1 val.)

Given

- *Inputs*

θ_o, φ_o	outdoor air conditions
$\theta_{I,sp}$, $\varphi_{I,sp}$	indoor air conditions set-points
$\dot{m}_o$	mass flow rate of outdoor air

- *Parameters*

β	by-pass factor of the cooling coil
K_θ	proportional controller gains