Parameters of case study

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TABLE I
BOUNDS, PHYSICAL PROPERTIES AND CHARACTERISTIC COEFFICIENTS

Parameters	Value	Parameters	Value
$T^{\text{sup}}_{\text{min}}$	4°C	C_p	4.2 kJ/kg
$T^{\text{sup}}_{\text{max}}$	10°C	ρ	997 kg/m^3
$T^{\text{re}}_{\text{min}}$	4°C	λ_w	0.55W/(m·°C)
$T^{\text{re}}_{\text{max}}$	15°C	μ	1.788×10^{-3} kg/(m·s)
$\dot{m}_{\text{min}}$	3 kg/s	β_1	2.75×10^{-9}
$\dot{m}_{\text{max}}$	10 kg/s	β_2	2.75×10^{-6}
$P^{\text{chi}}_{\text{min}}$	1800 kW	β_3	2.75×10^{-3}
$P^{\text{chi}}_{\text{max}}$	20 kW	β_4	0.825
$T^{\text{in}}_{\text{max}}$	24°C	ξ	0.075
$T^{\text{in}}_{\text{max}}$	28°C	Δt	5 min

TABLE II
ELECTRICITY PRICE IN MACAU

Time period	electricity price ($)
00:00-09:00, 20:00-24:00	0.1096
09:00-20:00	0.0962

I. OVERVIEW

This file collects all the necessary parameters of the case study in paper "Chance-constrained strategic operation of district cooling system with spatial-temporal demands".

II. LOWER AND UPPER BOUNDS, PHYSICAL PROPERTIES AND THE CHARACTERISTIC COEFFICIENTS

See Table I.

III. ELECTRICITY PRICE

See Table II.

IV. PARAMETERS OF DISTRICT PIPE NETWORK

The district pipe network of DCS in University of Macau contains 38 pipelines and 24 rooms. The parameters of pipelines are list in Table III. The heat transfer coefficients between pipelines and surroundings λ_i are set as 0.2 W/(m·°C).

V. PARAMETERS OF ROOMS

All rooms serving the same purpose in one building are aggregated as one individual room, so the corresponding heat capacity C_k is very large while the thermal resistance R_k between indoor and out environments is quite small (e.g. C_k and R_k are 333.3 kJ/°C and 0.09 °C/kW, respectively). The coefficient for calculating the maximum heat transfer capacity ω_k is 1.882 kW·$(\text{s/kg})^{0.84}$. The value of entries in matrix U are:

$$
\begin{aligned}
&\text{for } \forall k \in \mathcal{K} \text{ and } k \neq l: \\
&\quad u_{kl} = \begin{cases} 1.667kW/°\text{C}, & \text{room } k,l \text{ in one building,} \\ 0, & \text{room } k,l \text{ not in one building} \end{cases} \\
&\text{for } \forall k \in \mathcal{K} \text{ and } k = l: \\
&\quad u_{kk} = -\sum_{l \in \mathcal{K}/\{k\}} u_{kl}
\end{aligned} \tag{1}
$$

The heat load of each room can be found in https://github.com/lelouchsola/CC-OPD/blob/master/heat_loads.csv.

TABLE III
PARAMETERS OF PIPELINES

Pipeline No.	Length (m)	Internal diameter (m)
1	400	0.12
2	300	0.08
3	300	0.08
4	600	0.16
5	400	0.12
6	300	0.08
7	300	0.08
8	300	0.08
9	400	0.12
10	300	0.08
11	300	0.08
12	300	0.08
13	400	0.12
14	300	0.08
15	300	0.08
16	300	0.08
17	600	0.24
18	600	0.20
19	400	0.12
20	300	0.08
21	300	0.08
22	300	0.08
23	600	0.16
24	400	0.12
25	300	0.08
26	300	0.08
27	300	0.08
28	400	0.12
29	300	0.08
30	300	0.08
31	300	0.08
32	600	0.16
33	400	0.12
34	300	0.08
35	300	0.08
36	400	0.12
37	300	0.08
38	300	0.08

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