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Type977 fitting for heat pump HP20L-M-WEB

Parametric Heat Pump calculation

Dani Carbonell

dani.carbonell@spf.ch

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	
		$[kW]$
P_{Q_1}	1st condenser polynomial coefficient	2.7396e+01
P_{Q_2}	2st condenser polynomial coefficient	1.7515e+02
P_{Q_3}	3st condenser polynomial coefficient	-2.7277e+01
P_{Q_4}	4st condenser polynomial coefficient	-4.5302e+01
P_{Q_5}	5st condenser polynomial coefficient	4.1927e+02
P_{Q_6}	6st condenser polynomial coefficient	-1.2589e+02
P_{COP_1}	1st COP polynomial coefficient	9.8775e+00
P_{COP_2}	2st COP polynomial coefficient	5.5280e+01
P_{COP_3}	3st COP polynomial coefficient	-5.6793e+01
P_{COP_4}	4st COP polynomial coefficient	-1.8574e+02
P_{COP_5}	5st COP polynomial coefficient	7.3384e+01
P_{COP_6}	6st COP polynomial coefficient	9.4759e+01
$\dot{m}_{cond}$	4100.00 $[kg/h]$	
$\dot{m}_{evap}$	10250.00 $[kg/h]$	
COP_{nom} (A0W35)	4.16	
$Q_{cond,nom}$ (A0W35)	20.85 $[kW]$	
$Q_{evap,nom}$ (A0W35)	15.84 $[kW]$	
$W_{comp,nom}$ (A0W35)	5.01 $[kW]$	
RMS_{COP}	$1.11e-01$	
$RMS_{Q_{cond}}$	$6.22e-01$	
$RMS_{W_{comp}}$	$9.23e-02$	
Fit model	Average Temperature	

Table 2: Differences between experiments and fitted data for the heat pump. $error = 100 \cdot \left| \frac{Q_{exp} - Q_{num}}{Q_{exp}} \right|$ and $RMS = \sqrt{\sum \frac{(Q_{exp} - Q_{num})^2}{n_p}}$ where n_p is the number of data points.

$T_{cond,out}$ ^oC	$T_{evap,in}$ ^oC	COP $[-]$	COP_{exp} $[-]$	error $[\%]$	Q_{cond} $[kW]$	$Q_{cond,exp}$ $[kW]$	error $[\%]$	W_{comp} $[kW]$	$W_{comp,exp}$ $[kW]$	error $[\%]$
35.00	20.00	6.79	6.81	0.2	33.81	33.69	0.3	4.98	4.95	0.52
35.00	10.00	5.38	5.43	0.9	26.93	27.10	0.6	5.00	4.99	0.24
35.00	7.00	5.02	5.17	3.0	25.06	25.95	3.4	5.00	5.02	0.46
35.00	2.00	4.35	4.12	5.6	21.99	20.95	5.0	5.05	5.08	0.56
35.00	-7.00	3.39	3.27	3.6	17.19	16.73	2.7	5.07	5.11	0.79
35.00	-15.00	2.67	2.77	3.8	13.57	14.12	3.9	5.08	5.09	0.10
45.00	7.00	3.80	3.94	3.5	23.02	23.70	2.9	6.06	6.02	0.67
45.00	2.00	3.27	3.18	3.0	19.94	19.01	4.9	6.09	5.98	1.90
45.00	-7.00	2.52	2.52	0.1	15.13	14.70	2.9	6.00	5.84	2.78
45.00	-15.00	1.98	2.05	3.2	11.48	11.87	3.2	5.80	5.80	0.03
50.00	20.00	4.60	4.43	3.9	30.65	30.17	1.6	6.66	6.81	2.21
50.00	15.00	4.08	4.16	1.9	27.15	27.99	3.0	6.65	6.73	1.13
50.00	7.00	3.29	3.38	2.8	21.89	22.70	3.6	6.66	6.71	0.77
50.00	2.00	2.83	2.74	3.3	18.81	18.21	3.3	6.65	6.65	0.01
50.00	-7.00	2.18	2.14	2.0	13.98	13.85	0.9	6.41	6.48	1.03
55.00	20.00	4.00	3.98	0.5	29.44	28.83	2.1	7.37	7.25	1.64
55.00	7.00	2.83	2.99	5.2	20.67	21.36	3.2	7.30	7.15	2.05
55.00	-7.00	1.89	1.81	4.7	12.72	12.50	1.8	6.72	6.91	2.80
Sum				51.0			49.5			19.71
RMS_{COP}	$1.11e-01$									
$RMS_{Q_{cond}}$	$6.22e-01$									
$RMS_{W_{comp}}$	$9.23e-02$									

Figure 1: Q_{cond} differences between experiments and fitted data

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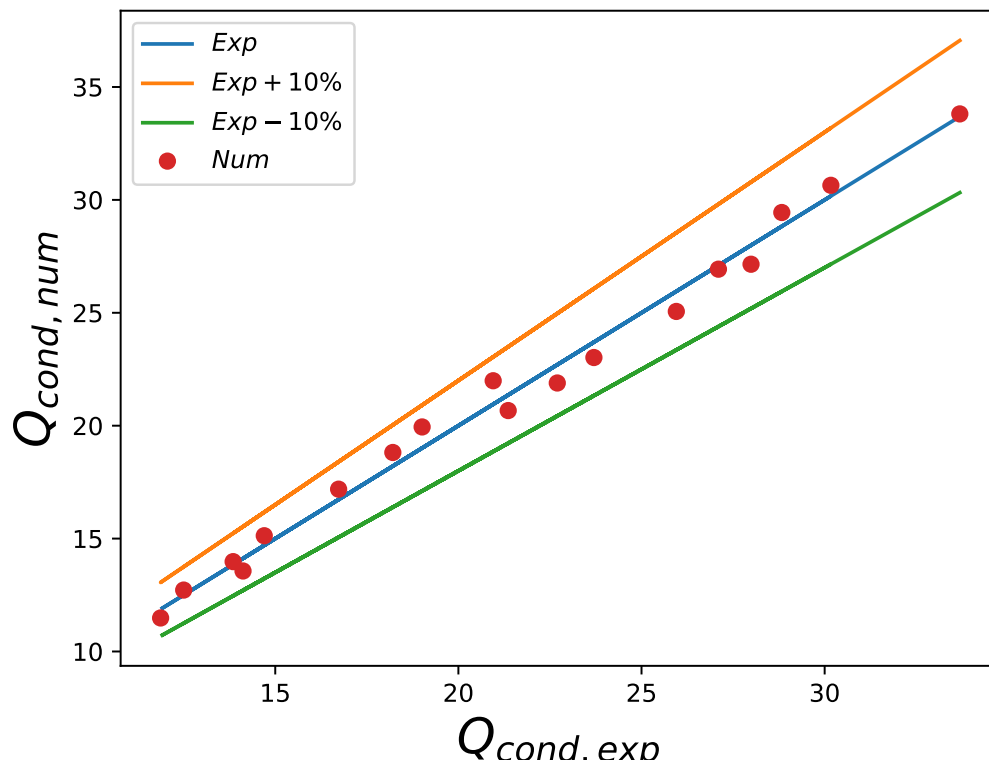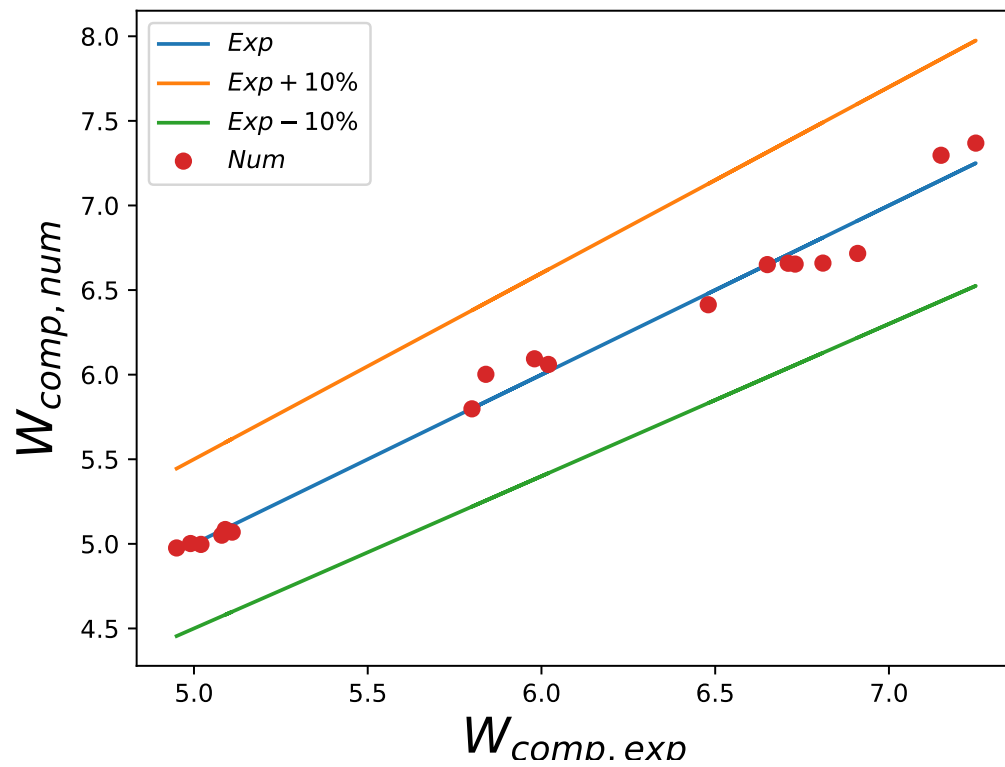RAPPERSWIL

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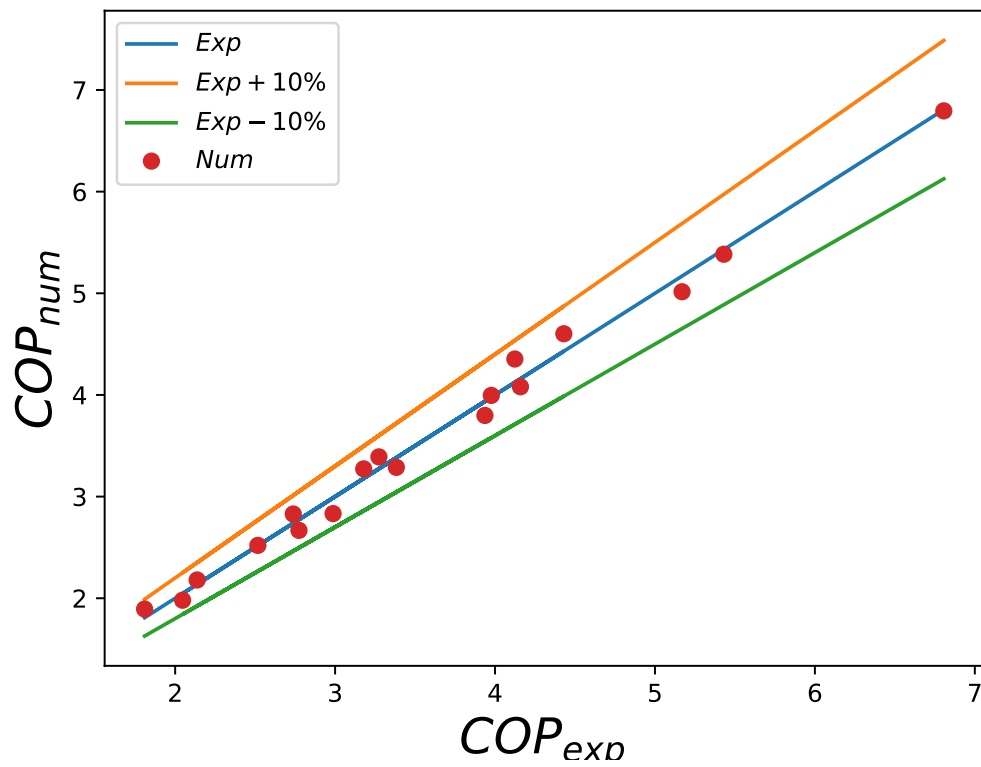
Figure 2: W_{comp} differences between experiments and fitted data

Figure 3: COP differences between experiments and fitted data