INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump HP16L-WEB

Parametric Heat Pump calculation

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	$[kW]$
P_{Q_1}	1^{st} *condenser polynomial coefficient*	1.7493e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	2.0354e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	7.4364e+00
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-3.3252e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	2.9061e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-1.4546e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	8.0846e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	7.5506e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-3.4131e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	-2.8785e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	5.5102e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	2.5037e+01
$\dot{m}_{cond}$	3200.00 $[kg/h]$	
$\dot{m}_{evap}$	8000.00 $[kg/h]$	
COP_{nom} (A0W35)	4.01	
$Q_{cond,nom}$ (A0W35)	14.84 $[kW]$	
$Q_{evap,nom}$ (A0W35)	11.14 $[kW]$	
$W_{comp,nom}$ (A0W35)	3.71 $[kW]$	
RMS_{COP}	$1.20e-01$	
$RMS_{Q_{cond}}$	$5.51e-01$	
$RMS_{W_{comp}}$	$7.38e-02$	
Fit model	Average Temperature	

Table 2: Differences between experiments and fitted data for the heat pump. $error = 100 \cdot |\frac{Q_{exp}-Q_{num}}{Q_{exp}}|$ 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	7.09	7.07	0.3	26.86	26.46	1.5	3.79	3.74	1.26
35.00	10.00	5.49	5.50	0.2	20.65	20.85	1.0	3.76	3.79	0.72
35.00	7.00	5.05	5.20	2.8	18.92	19.75	4.2	3.74	3.80	1.45
35.00	2.00	4.28	4.12	3.9	16.09	15.58	3.3	3.76	3.78	0.64
35.00	-7.00	3.10	3.30	6.2	11.47	12.19	5.9	3.70	3.69	0.30
35.00	-15.00	2.11	1.90	10.9	7.77	6.79	14.4	3.68	3.57	3.16
45.00	7.00	3.90	3.88	0.5	17.72	17.92	1.1	4.55	4.62	1.61
45.00	2.00	3.32	3.17	4.8	15.05	14.28	5.4	4.54	4.51	0.59
45.00	-7.00	2.44	2.44	0.1	10.73	10.65	0.7	4.40	4.37	0.63
45.00	-15.00	1.76	1.98	11.1	7.32	8.40	12.8	4.16	4.24	2.00
50.00	20.00	4.74	4.63	2.4	24.35	24.03	1.3	5.14	5.19	1.05
50.00	15.00	4.20	4.31	2.7	21.43	22.00	2.6	5.10	5.10	0.07
50.00	7.00	3.35	3.41	1.7	16.99	17.10	0.7	5.08	5.02	1.11
50.00	2.00	2.86	2.80	2.2	14.40	13.77	4.6	5.03	4.92	2.33
50.00	-7.00	2.13	2.10	1.6	10.21	10.00	2.1	4.79	4.76	0.56
55.00	20.00	3.99	4.01	0.5	23.35	23.43	0.3	5.85	5.84	0.15
55.00	7.00	2.81	2.91	3.3	16.18	16.50	1.9	5.75	5.67	1.38
55.00	-7.00	1.84	1.74	6.0	9.61	9.40	2.2	5.21	5.41	3.61
Sum				61.0			66.0			22.62
RMS_{COP}	$1.20e-01$									
$RMS_{Q_{cond}}$	$5.51e-01$									
$RMS_{W_{comp}}$	$7.38e-02$									

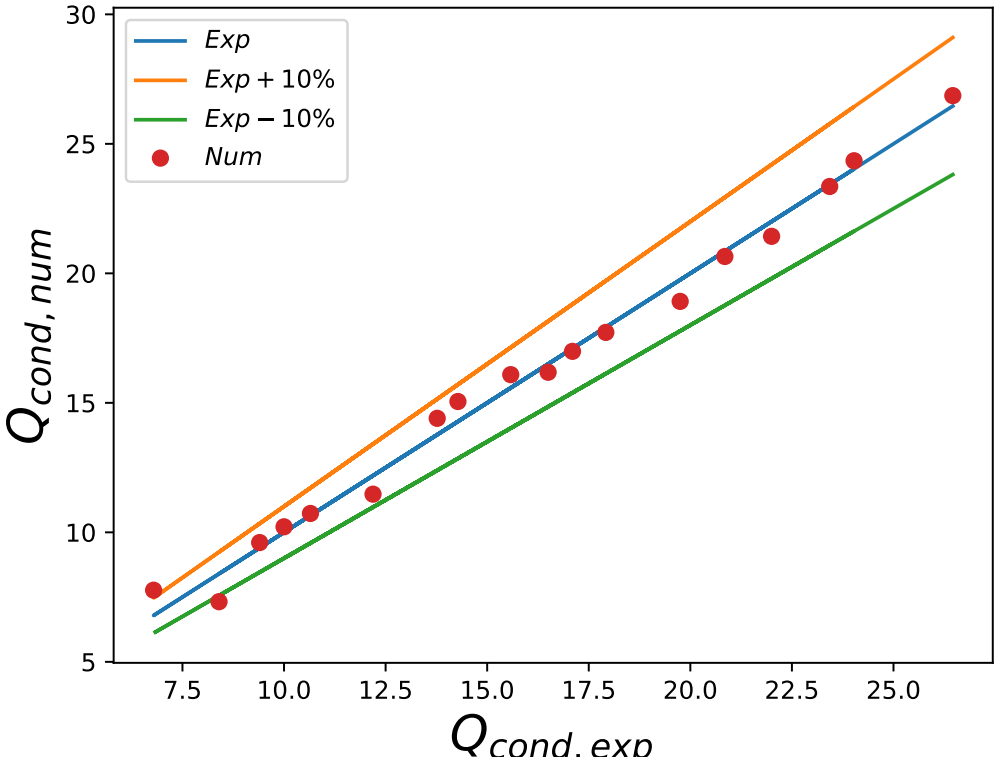

Figure 1: Q_{cond} differences between experiments and fitted data

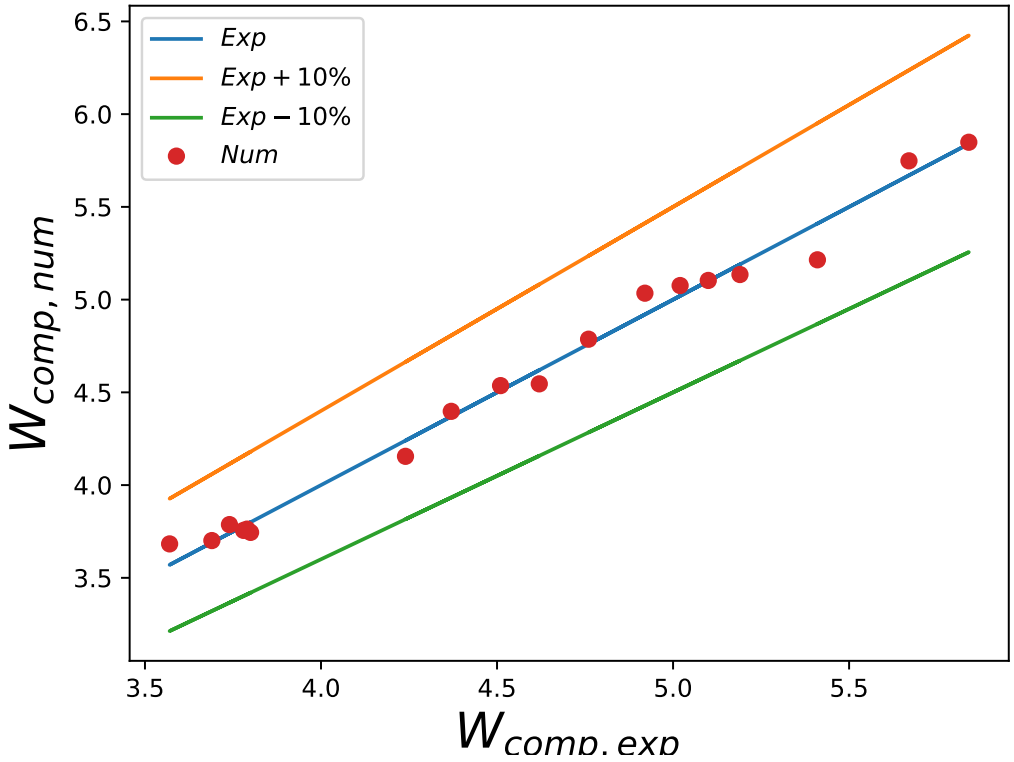

Figure 2: W_{comp} differences between experiments and fitted data

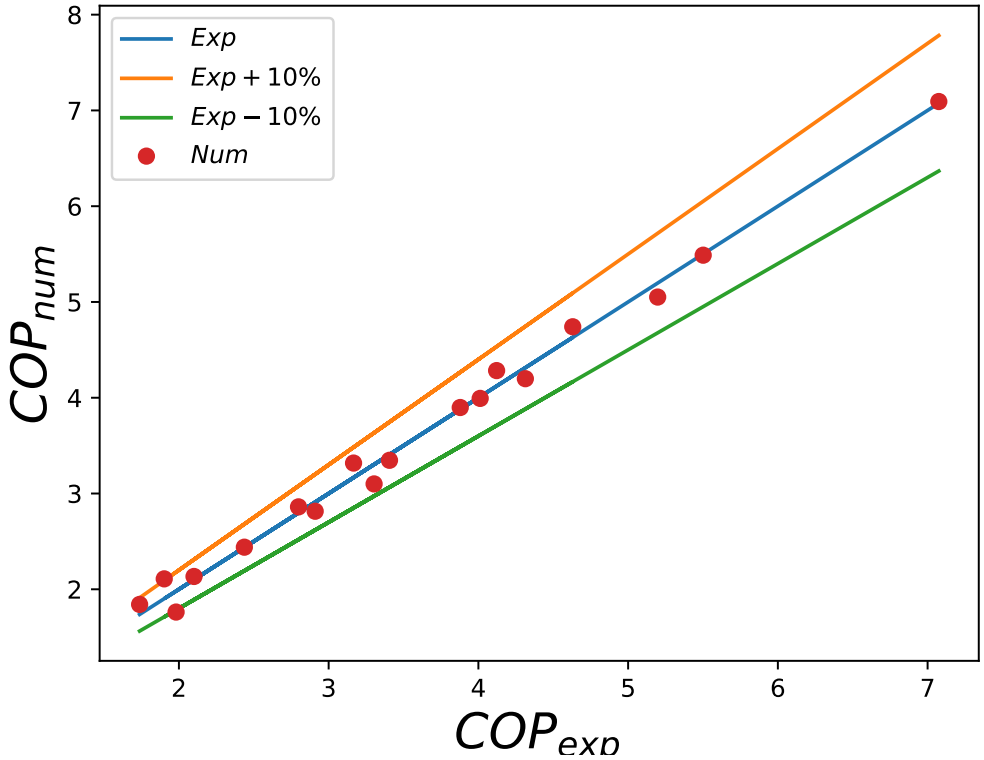

Figure 3: COP differences between experiments and fitted data