INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump HP08L-M-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*	1.3105e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	1.0827e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	7.6272e+00
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-8.4265e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	1.9269e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-1.2714e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	1.0166e+01
P_{COP_2}	2^{st} *COP polynomial coefficient*	5.8832e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-5.9006e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	-2.0436e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	7.8244e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	9.9326e+01
$\dot{m}_{cond}$	2900.00 $[kg/h]$	
$\dot{m}_{evap}$	7250.00 $[kg/h]$	
COP_{nom} (A0W35)	4.24	
$Q_{cond,nom}$ (A0W35)	11.33 $[kW]$	
$Q_{evap,nom}$ (A0W35)	8.66 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.67 $[kW]$	
RMS_{COP}	$1.13e-01$	
$RMS_{Q_{cond}}$	$3.77e-01$	
$RMS_{W_{comp}}$	$6.21e-02$	
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	6.99	7.04	0.7	18.94	18.72	1.2	2.71	2.66	1.89
35.00	10.00	5.53	5.56	0.6	15.02	15.34	2.1	2.72	2.76	1.49
35.00	7.00	5.13	5.23	1.9	13.93	14.54	4.2	2.72	2.78	2.32
35.00	2.00	4.44	4.21	5.6	12.16	11.49	5.8	2.74	2.73	0.22
35.00	-7.00	3.44	3.35	2.8	9.29	8.97	3.6	2.70	2.68	0.80
35.00	-15.00	2.69	2.81	4.3	7.05	7.31	3.5	2.62	2.60	0.80
45.00	7.00	3.86	4.03	4.2	12.97	13.47	3.7	3.36	3.34	0.56
45.00	2.00	3.32	3.23	2.9	11.23	10.66	5.3	3.38	3.30	2.34
45.00	-7.00	2.56	2.54	0.7	8.43	8.20	2.8	3.30	3.23	2.10
45.00	-15.00	2.01	2.06	2.5	6.24	6.56	4.8	3.10	3.18	2.40
50.00	20.00	4.68	4.49	4.3	17.24	16.98	1.6	3.68	3.78	2.59
50.00	15.00	4.14	4.21	1.7	15.30	15.70	2.5	3.70	3.73	0.83
50.00	7.00	3.32	3.43	3.0	12.37	12.72	2.8	3.72	3.71	0.27
50.00	2.00	2.86	2.79	2.7	10.64	10.24	3.9	3.72	3.67	1.23
50.00	-7.00	2.21	2.17	2.1	7.87	7.80	0.9	3.56	3.60	1.14
55.00	20.00	4.05	4.02	0.7	16.52	16.28	1.4	4.08	4.05	0.79
55.00	7.00	2.85	3.02	5.5	11.68	12.02	2.9	4.09	3.98	2.80
55.00	-7.00	1.93	1.84	4.9	7.22	7.11	1.5	3.75	3.87	3.23
Sum				50.9			54.5			27.78
RMS_{COP}	$1.13e-01$									
$RMS_{Q_{cond}}$	$3.77e-01$									
$RMS_{W_{comp}}$	$6.21e-02$									

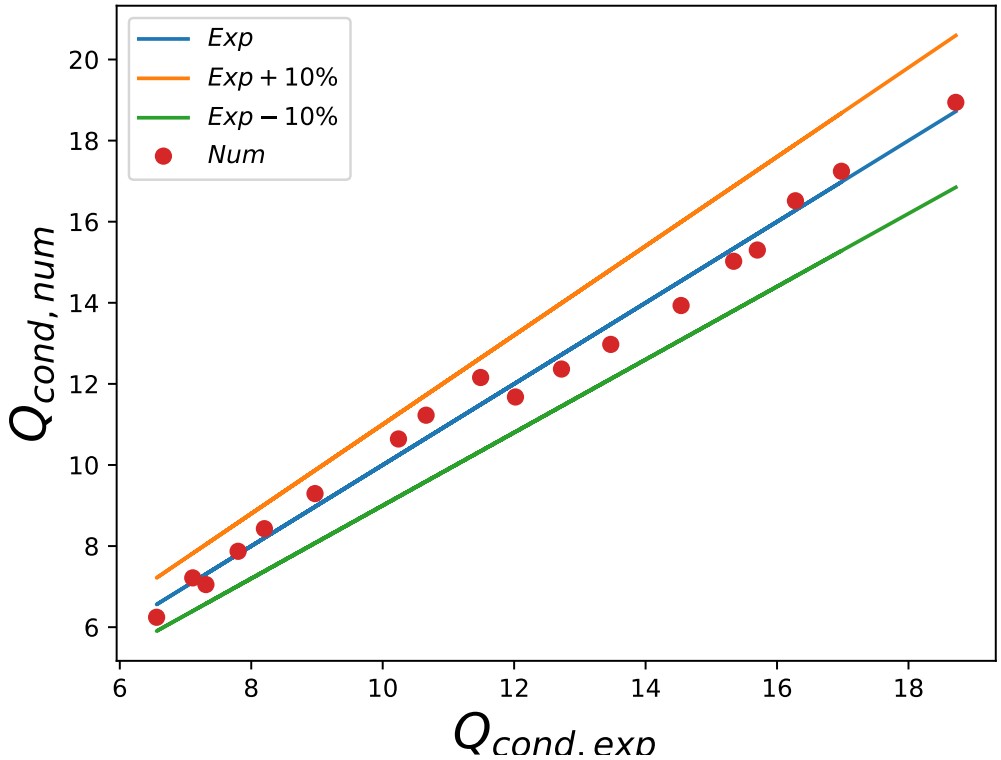

Figure 1: Q_{cond} differences between experiments and fitted data

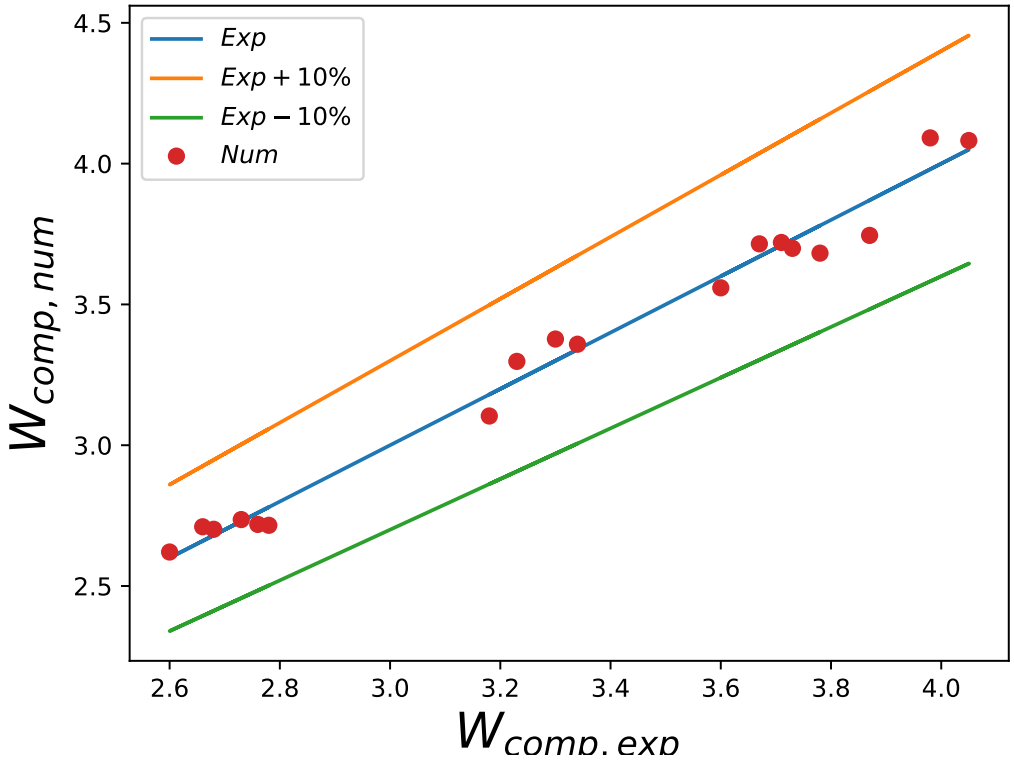

Figure 2: W_{comp} differences between experiments and fitted data

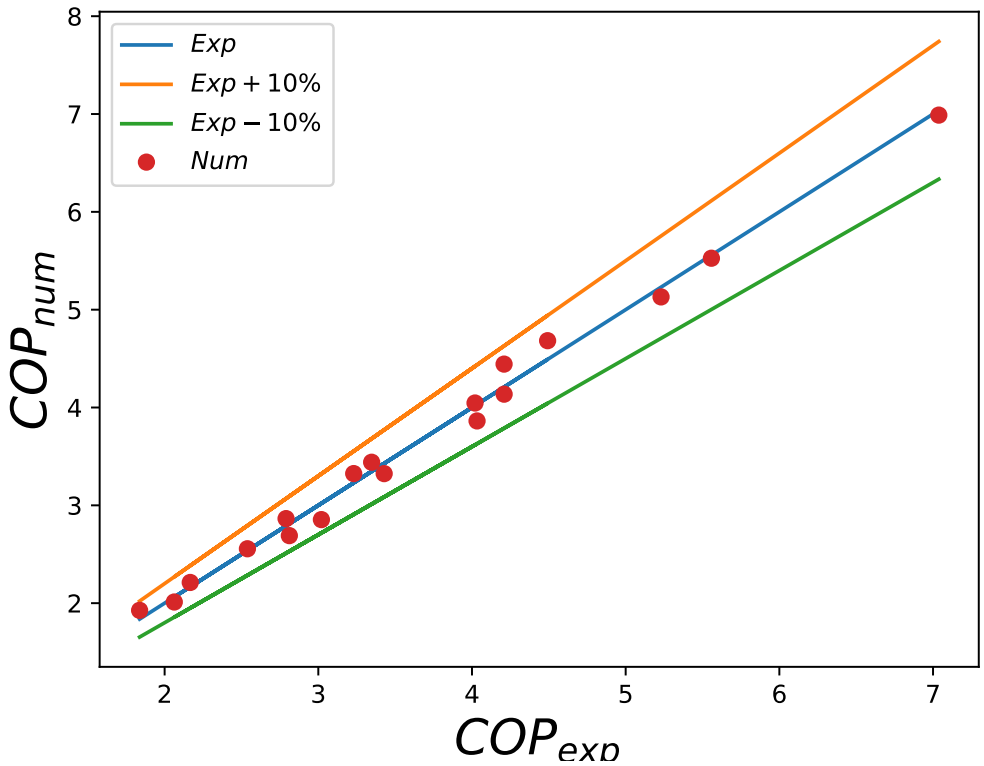

Figure 3: COP differences between experiments and fitted data