INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINK-11TE

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*	1.0793e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	7.0469e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	2.7052e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	1.2193e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	2.5138e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-1.2707e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.4973e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	3.0554e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	3.1564e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	8.3585e+00
P_{COP_5}	5^{st} *COP polynomial coefficient*	3.2462e+00
P_{COP_6}	6^{st} *COP polynomial coefficient*	-8.7923e+01
$\dot{m}_{cond}$	2000.00 $[kg/h]$	
$\dot{m}_{evap}$	2000.00 $[kg/h]$	
COP_{nom} (A0W35)	4.34	
$Q_{cond,nom}$ (A0W35)	11.44 $[kW]$	
$Q_{evap,nom}$ (A0W35)	8.80 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.64 $[kW]$	
RMS_{COP}	$3.46e-02$	
$RMS_{Q_{cond}}$	$9.50e-02$	
$RMS_{W_{comp}}$	$4.90e-02$	
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	-5.00	3.82	3.81	0.4	10.11	9.90	2.2	2.65	2.60	1.80
35.00	0.00	4.39	4.40	0.2	11.56	11.70	1.2	2.63	2.66	0.96
35.00	5.00	4.94	4.94	0.0	13.01	13.10	0.7	2.63	2.65	0.70
50.00	-5.00	2.60	2.57	1.3	9.50	9.70	2.1	3.65	3.77	3.30
50.00	0.00	3.16	3.13	1.1	11.05	10.97	0.7	3.49	3.51	0.40
50.00	5.00	3.74	3.67	1.7	12.61	12.57	0.4	3.38	3.42	1.30
45.00	-5.00	3.06	3.07	0.4	9.77	9.80	0.3	3.19	3.19	0.12
45.00	0.00	3.63	3.68	1.3	11.29	11.33	0.4	3.11	3.08	0.90
45.00	5.00	4.20	4.23	0.7	12.82	12.83	0.1	3.05	3.04	0.64
55.00	0.00	2.64	2.70	2.0	10.74	10.60	1.3	4.06	3.93	3.39
55.00	5.00	3.22	3.23	0.3	12.34	12.30	0.3	3.83	3.81	0.60
35.00	10.00	5.50	5.49	0.2	14.47	14.50	0.2	2.63	2.64	0.38
35.00	15.00	6.06	6.05	0.3	15.94	15.90	0.3	2.63	2.63	0.01
50.00	10.00	4.31	4.25	1.5	14.19	14.17	0.2	3.29	3.33	1.28
50.00	15.00	4.89	4.86	0.7	15.78	15.77	0.1	3.23	3.25	0.64
45.00	10.00	4.77	4.80	0.7	14.36	14.33	0.2	3.01	2.99	0.87
45.00	15.00	5.34	5.39	1.0	15.91	15.83	0.5	2.98	2.94	1.47
55.00	10.00	3.81	3.80	0.1	13.96	14.00	0.3	3.67	3.68	0.40
55.00	15.00	4.39	4.42	0.5	15.58	15.70	0.8	3.55	3.56	0.23
Sum				14.3			12.0			19.40
RMS_{COP}	$3.46e-02$									
$RMS_{Q_{cond}}$	$9.50e-02$									
$RMS_{W_{comp}}$	$4.90e-02$									

Meier/SINK-11TE/SINK-11TE-Qcond.pdf

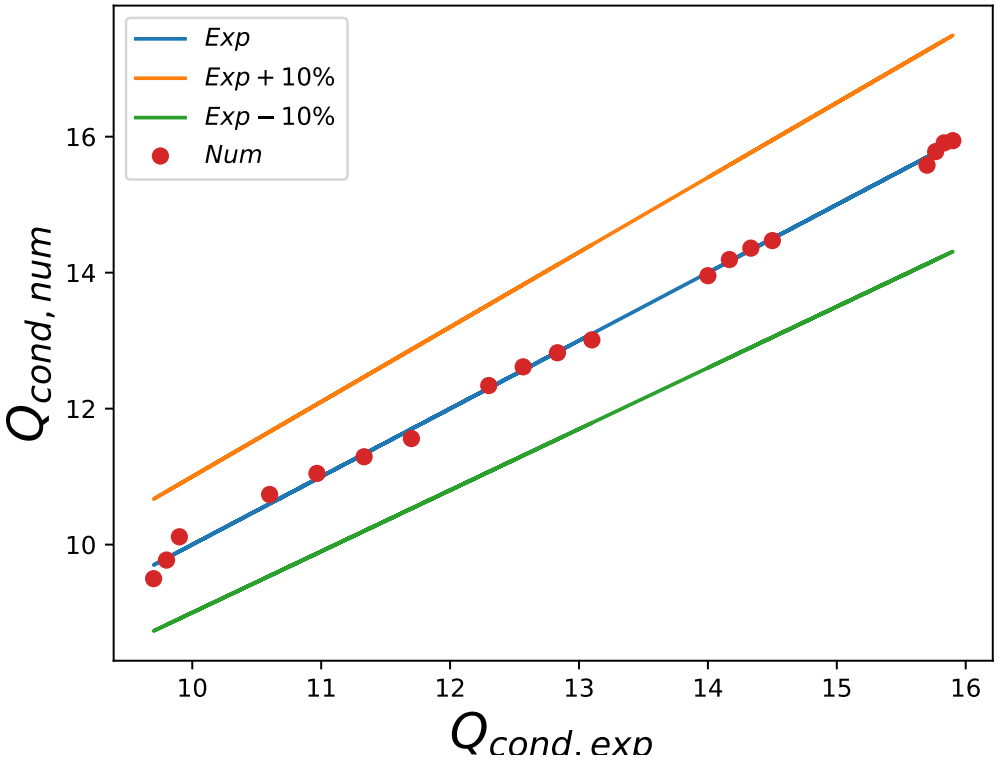

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINK-11TE/SINK-11TE-Qcomp.pdf

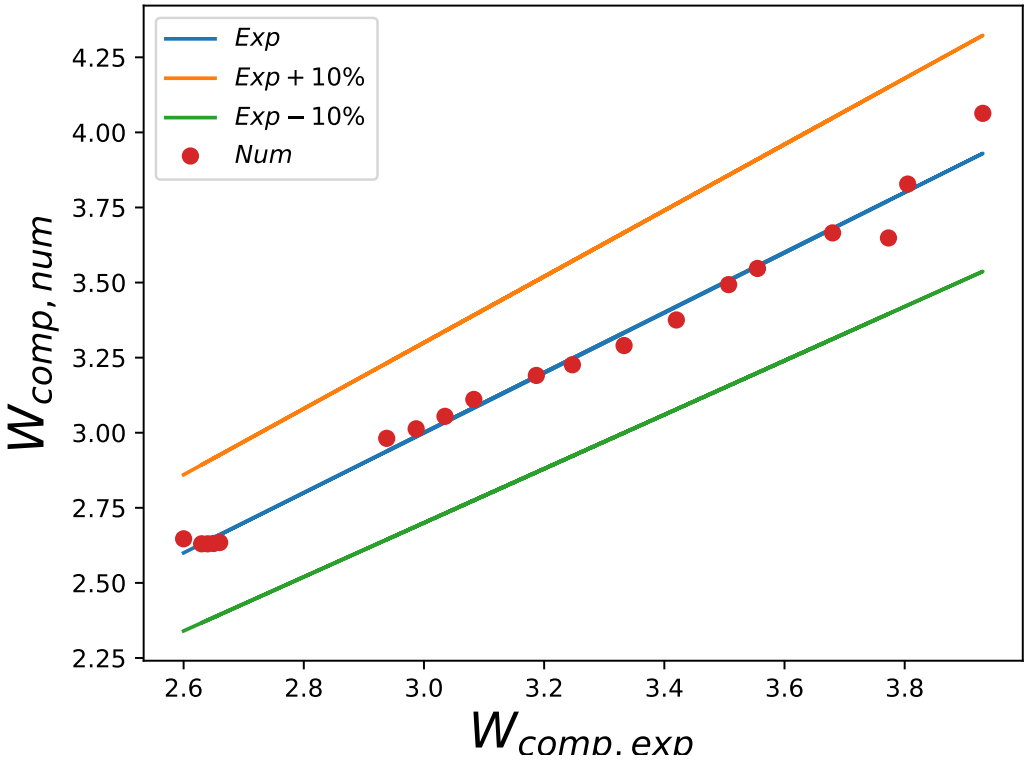

Figure 2: W_{comp} differences between experiments and fitted data

Meier/SINK-11TE/SINK-11TE-COP.pdf

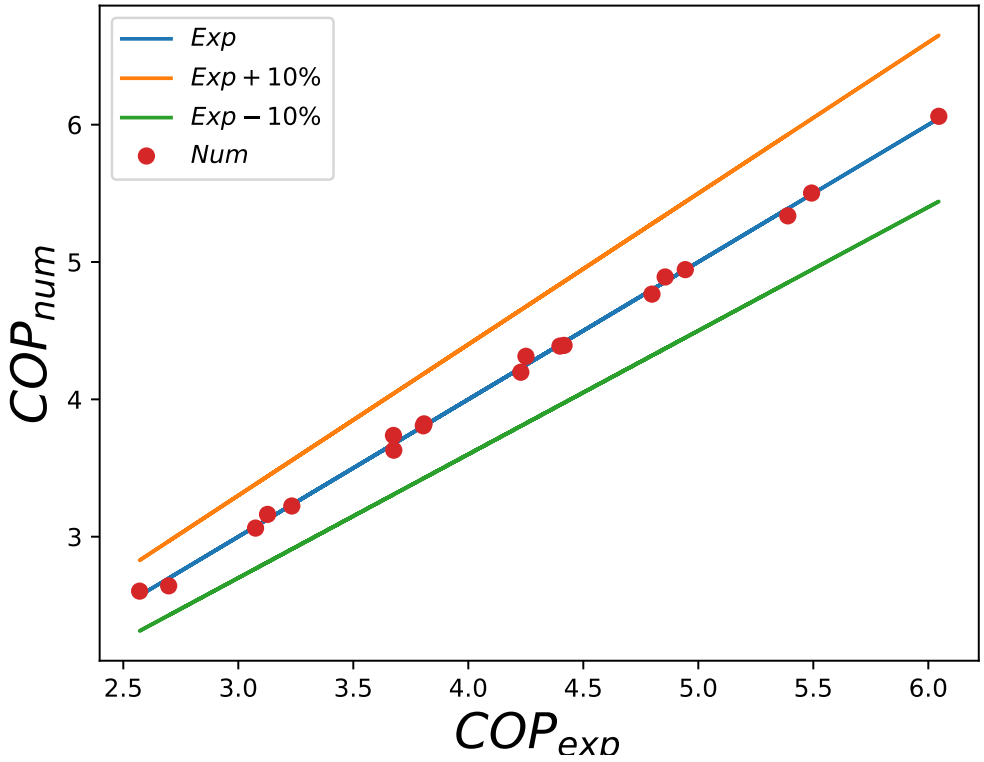

Figure 3: *COP* differences between experiments and fitted data