INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINK-14TE

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*	1.3795e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	8.0910e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	2.7265e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	2.3194e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	1.8914e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-1.3732e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	4.4828e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	1.3248e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	1.5073e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	1.3214e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	2.6714e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	-1.2165e+02
$\dot{m}_{cond}$	2500.00 $[kg/h]$	
$\dot{m}_{evap}$	2500.00 $[kg/h]$	
COP_{nom} (A0W35)	4.31	
$Q_{cond,nom}$ (A0W35)	14.10 $[kW]$	
$Q_{evap,nom}$ (A0W35)	10.83 $[kW]$	
$W_{comp,nom}$ (A0W35)	3.27 $[kW]$	
RMS_{COP}	$8.94e-02$	
$RMS_{Q_{cond}}$	$8.74e-02$	
$RMS_{W_{comp}}$	$7.73e-02$	
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	3.97	3.80	4.5	12.41	12.20	1.7	3.12	3.21	2.73
35.00	0.00	4.35	4.40	1.2	14.27	14.40	0.9	3.28	3.27	0.35
35.00	5.00	4.87	5.00	2.7	16.13	16.20	0.5	3.31	3.24	2.30
50.00	-5.00	2.67	2.84	5.8	11.53	11.67	1.2	4.31	4.11	4.88
50.00	0.00	3.18	3.04	4.7	13.59	13.53	0.4	4.27	4.45	4.09
50.00	5.00	3.84	3.76	2.2	15.65	15.60	0.3	4.07	4.15	1.83
45.00	-5.00	3.18	3.26	2.3	11.89	11.93	0.4	3.73	3.66	2.00
45.00	0.00	3.65	3.62	1.0	13.89	13.97	0.5	3.80	3.86	1.47
45.00	5.00	4.26	4.31	1.0	15.89	15.90	0.1	3.73	3.69	0.91
55.00	0.00	2.64	2.60	1.7	13.22	13.10	0.9	5.00	5.04	0.72
55.00	5.00	3.35	3.33	0.8	15.34	15.30	0.3	4.58	4.60	0.49
35.00	10.00	5.53	5.61	1.4	17.97	18.00	0.1	3.25	3.21	1.28
35.00	15.00	6.34	6.23	1.8	19.82	19.80	0.1	3.13	3.18	1.67
50.00	10.00	4.64	4.60	1.0	17.70	17.67	0.2	3.81	3.84	0.83
50.00	15.00	5.59	5.57	0.2	19.75	19.73	0.1	3.53	3.54	0.14
45.00	10.00	5.02	5.06	0.8	17.87	17.83	0.2	3.56	3.53	1.01
45.00	15.00	5.91	5.88	0.5	19.86	19.77	0.5	3.36	3.36	0.07
55.00	10.00	4.20	4.21	0.2	17.45	17.50	0.3	4.16	4.16	0.08
55.00	15.00	5.19	5.30	2.0	19.57	19.70	0.7	3.77	3.72	1.40
Sum				35.9			9.3			28.27
RMS_{COP}	$8.94e-02$									
$RMS_{Q_{cond}}$	$8.74e-02$									
$RMS_{W_{comp}}$	$7.73e-02$									

Meier/SINK-14TE/SINK-14TE-Qcond.pdf

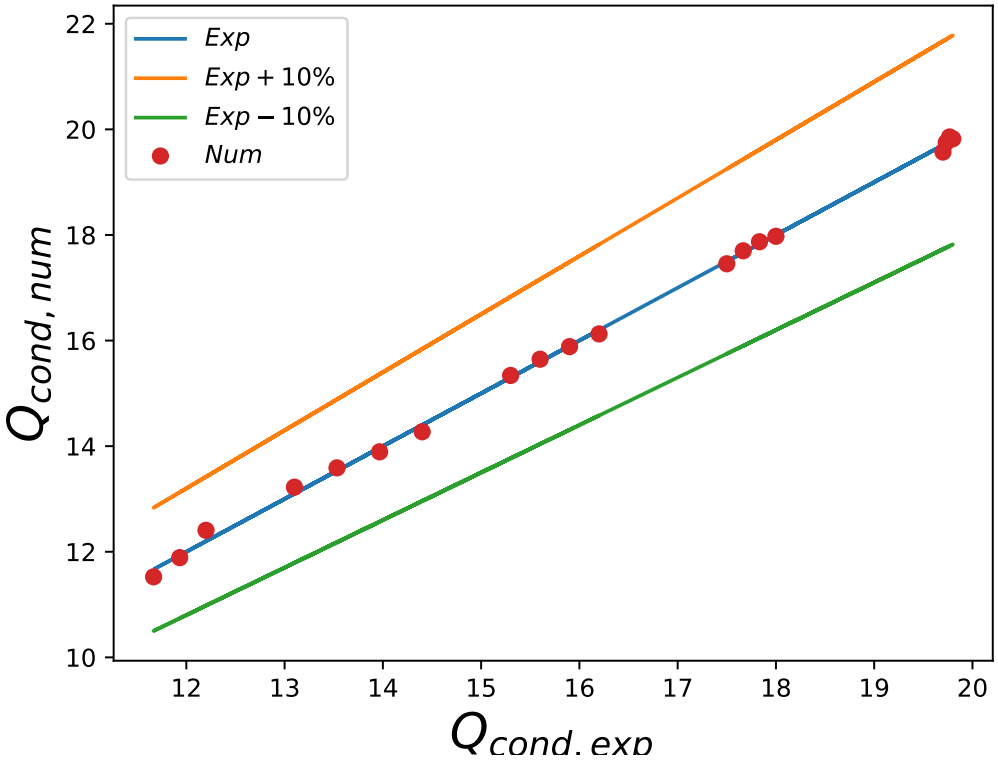

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINK-14TE/SINK-14TE-Qcomp.pdf

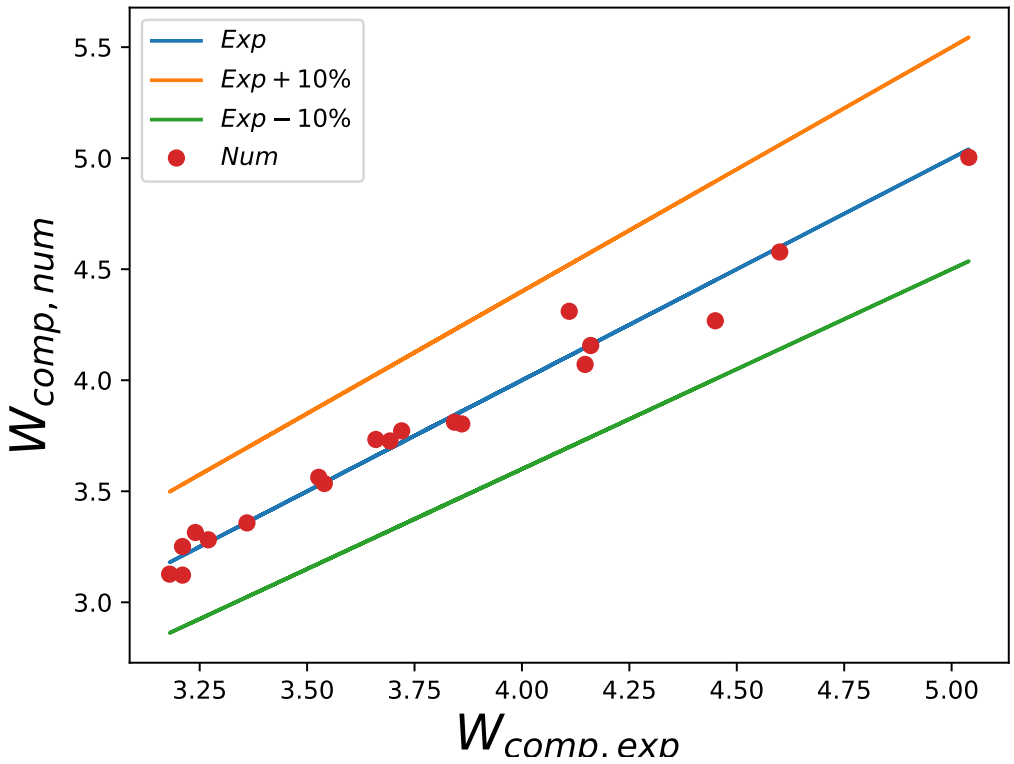

Figure 2: W_{comp} differences between experiments and fitted data

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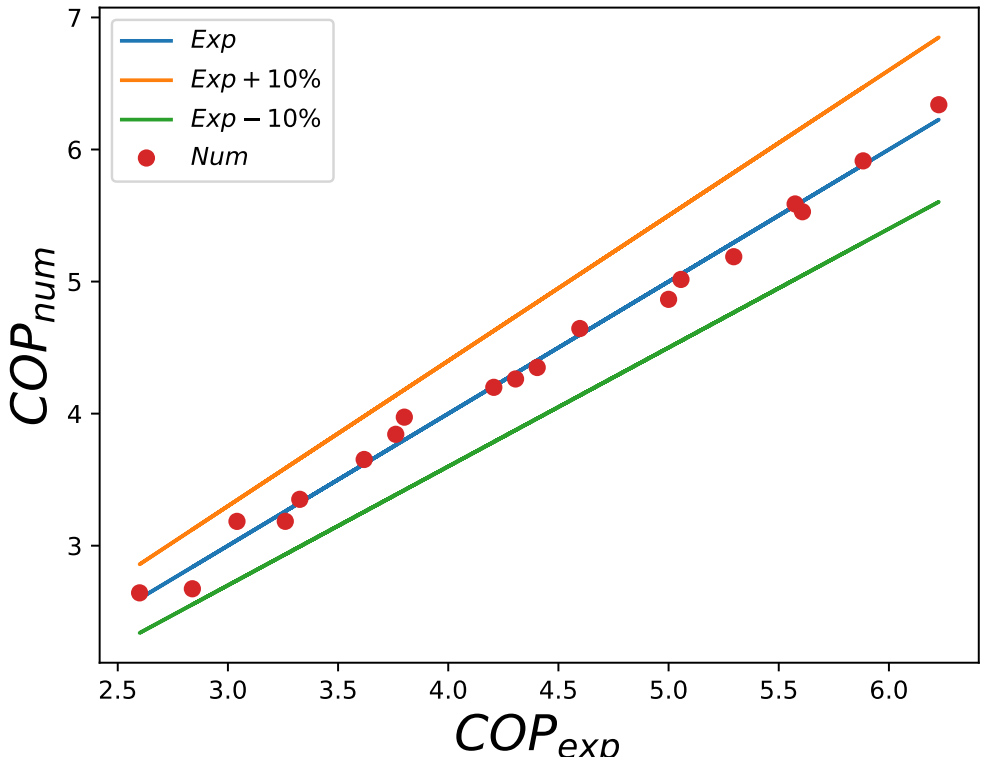

Figure 3: *COP* differences between experiments and fitted data