INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINK-9TE

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*	9.5792e+00
P_{Q_2}	2^{st} *condenser polynomial coefficient*	6.6935e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	6.4401e+00
P_{Q_4}	4^{st} *condenser polynomial coefficient*	7.7282e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	-9.8567e+00
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-5.2978e+01
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.3350e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	5.1647e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	4.0227e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-1.0541e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	4.0396e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	-8.6586e+01
$\dot{m}_{cond}$	1600.00 $[kg/h]$	
$\dot{m}_{evap}$	1600.00 $[kg/h]$	
COP_{nom} (A0W35)	4.23	
$Q_{cond,nom}$ (A0W35)	8.90 $[kW]$	
$Q_{evap,nom}$ (A0W35)	6.80 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.10 $[kW]$	
RMS_{COP}	$5.25e-02$	
$RMS_{Q_{cond}}$	$8.55e-02$	
$RMS_{W_{comp}}$	$2.13e-02$	
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	3.64	3.60	1.1	7.72	7.70	0.3	2.12	2.14	0.77
35.00	0.00	4.29	4.31	0.3	9.02	9.00	0.3	2.10	2.09	0.58
35.00	5.00	4.98	4.99	0.2	10.32	10.30	0.2	2.07	2.06	0.39
50.00	-5.00	2.62	2.64	0.8	7.21	7.23	0.4	2.75	2.74	0.39
50.00	0.00	3.19	3.11	2.4	8.58	8.53	0.5	2.69	2.74	1.86
50.00	5.00	3.78	3.72	1.6	9.94	9.93	0.1	2.63	2.67	1.54
45.00	-5.00	3.02	3.06	1.4	7.40	7.47	0.8	2.45	2.44	0.56
45.00	0.00	3.61	3.63	0.4	8.75	8.77	0.2	2.42	2.42	0.20
45.00	5.00	4.24	4.27	0.8	10.09	10.12	0.2	2.38	2.37	0.57
55.00	0.00	2.70	2.70	0.1	8.38	8.30	0.9	3.10	3.07	1.03
55.00	5.00	3.27	3.28	0.3	9.76	9.75	0.1	2.98	2.97	0.46
35.00	10.00	5.69	5.69	0.0	11.60	11.60	0.0	2.04	2.04	0.02
35.00	15.00	6.43	6.40	0.4	12.87	12.90	0.2	2.00	2.02	0.57
50.00	10.00	4.41	4.37	0.9	11.29	11.33	0.3	2.56	2.59	1.23
50.00	15.00	5.04	4.90	2.9	12.64	12.33	2.5	2.51	2.52	0.46
45.00	10.00	4.89	4.95	1.1	11.42	11.47	0.4	2.33	2.32	0.76
45.00	15.00	5.57	5.65	1.4	12.75	12.82	0.5	2.29	2.27	0.86
55.00	10.00	3.87	3.90	0.8	11.14	11.20	0.5	2.88	2.87	0.27
55.00	15.00	4.50	4.57	1.5	12.51	12.65	1.1	2.78	2.77	0.38
Sum				18.4			9.5			12.91
RMS_{COP}	$5.25e-02$									
$RMS_{Q_{cond}}$	$8.55e-02$									
$RMS_{W_{comp}}$	$2.13e-02$									

Meier/SINK-9TE/SINK-9TE-Qcond.pdf

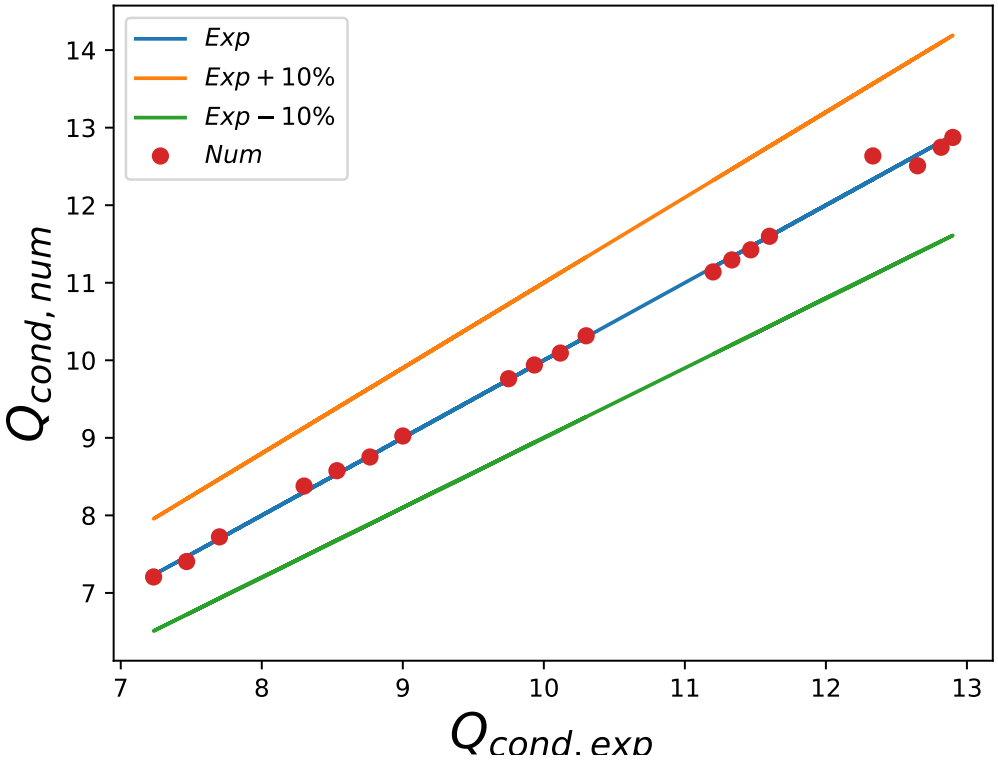

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINK-9TE/SINK-9TE-Qcomp.pdf

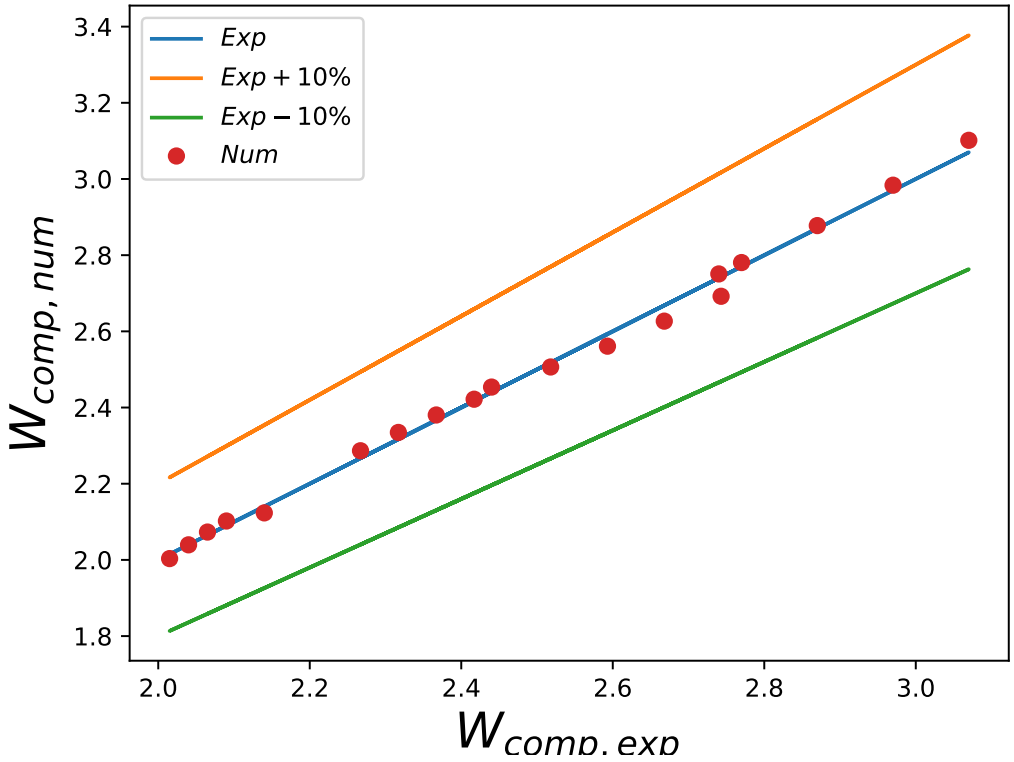

Figure 2: W_{comp} differences between experiments and fitted data

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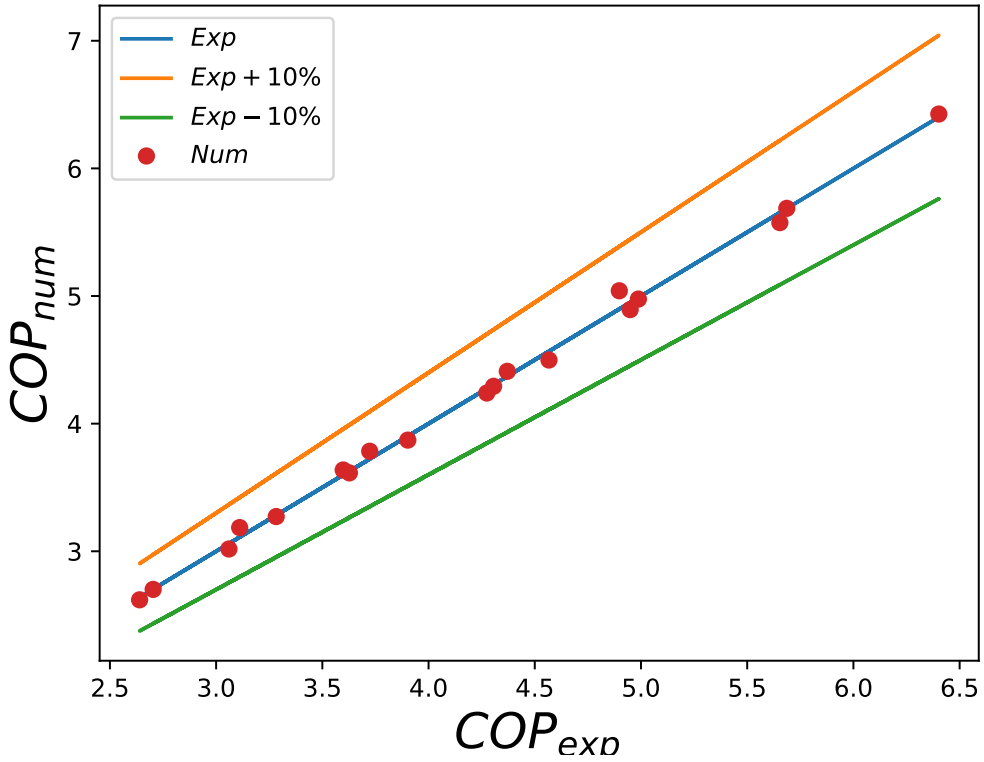

Figure 3: *COP* differences between experiments and fitted data