INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINH-6TE

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*	5.8504e+00
P_{Q_2}	2^{st} *condenser polynomial coefficient*	6.9958e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	1.6722e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-6.6209e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	2.4229e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-8.6303e+01
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.4226e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	5.9003e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	7.0235e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-1.4278e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	-2.8553e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	-1.0294e+02
$\dot{m}_{cond}$	1000.00 $[kg/h]$	
$\dot{m}_{evap}$	1000.00 $[kg/h]$	
COP_{nom} (A0W35)	4.41	
$Q_{cond,nom}$ (A0W35)	6.05 $[kW]$	
$Q_{evap,nom}$ (A0W35)	4.68 $[kW]$	
$W_{comp,nom}$ (A0W35)	1.37 $[kW]$	
RMS_{COP}	$3.84e-02$	
$RMS_{Q_{cond}}$	$1.33e-02$	
$RMS_{W_{comp}}$	$1.46e-02$	
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	3.73	3.70	0.9	5.09	5.10	0.1	1.37	1.38	0.98
35.00	0.00	4.46	4.49	0.5	6.11	6.10	0.2	1.37	1.36	0.74
35.00	5.00	5.19	5.20	0.2	7.15	7.15	0.0	1.38	1.38	0.18
50.00	-5.00	2.67	2.67	0.2	4.77	4.78	0.2	1.79	1.79	0.41
50.00	0.00	3.29	3.23	1.7	5.74	5.71	0.5	1.75	1.77	1.14
50.00	5.00	3.90	3.83	1.8	6.73	6.72	0.2	1.73	1.75	1.62
45.00	-5.00	3.09	3.11	0.7	4.93	4.94	0.2	1.59	1.59	0.46
45.00	0.00	3.75	3.78	0.8	5.92	5.91	0.2	1.58	1.56	1.00
45.00	5.00	4.40	4.43	0.7	6.92	6.94	0.2	1.57	1.56	0.54
55.00	0.00	2.76	2.80	1.4	5.52	5.52	0.0	2.00	1.97	1.49
55.00	5.00	3.33	3.35	0.4	6.50	6.51	0.2	1.95	1.95	0.17
35.00	10.00	5.90	5.90	0.1	8.20	8.20	0.1	1.39	1.39	0.15
35.00	15.00	6.61	6.58	0.4	9.26	9.25	0.1	1.40	1.41	0.33
50.00	10.00	4.50	4.44	1.5	7.74	7.73	0.1	1.72	1.74	1.38
50.00	15.00	5.10	5.05	1.0	8.76	8.74	0.2	1.72	1.73	0.73
45.00	10.00	5.04	5.08	0.8	7.95	7.97	0.3	1.58	1.57	0.54
45.00	15.00	5.68	5.74	1.1	8.98	9.00	0.2	1.58	1.57	0.93
55.00	10.00	3.90	3.91	0.2	7.49	7.50	0.2	1.92	1.92	0.06
55.00	15.00	4.45	4.48	0.7	8.49	8.49	0.0	1.91	1.90	0.71
Sum				15.2			3.2			13.57
RMS_{COP}	$3.84e-02$									
$RMS_{Q_{cond}}$	$1.33e-02$									
$RMS_{W_{comp}}$	$1.46e-02$									

Meier/SINH-6TE/SINH-6TE-Qcond.pdf

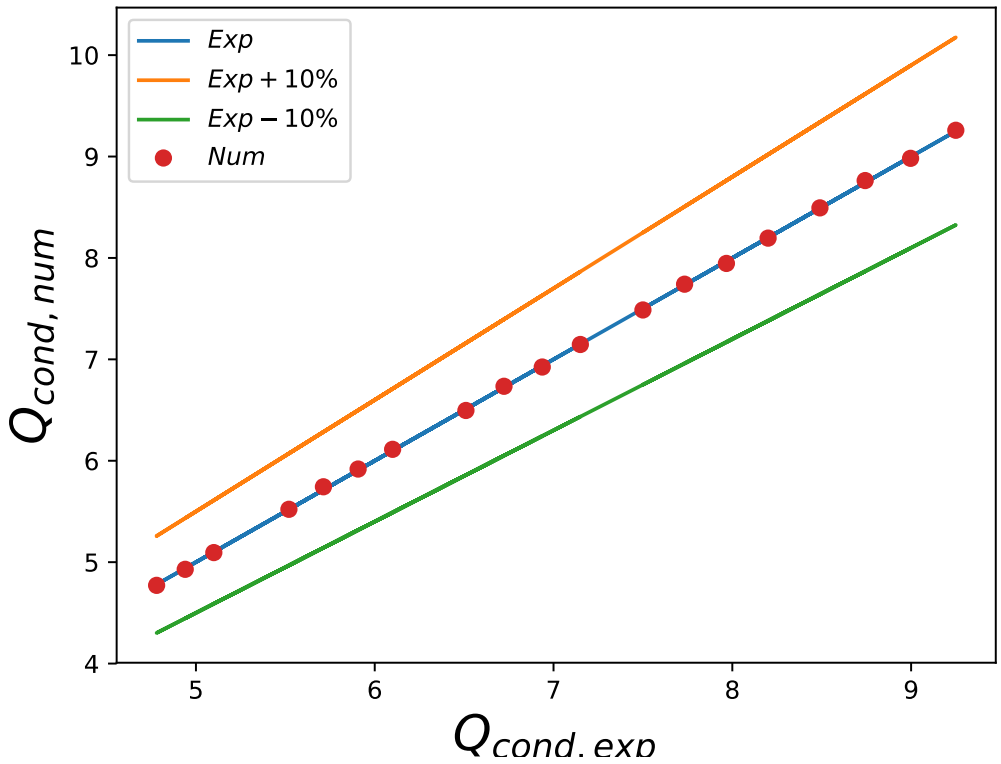

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINH-6TE/SINH-6TE-Qcomp.pdf

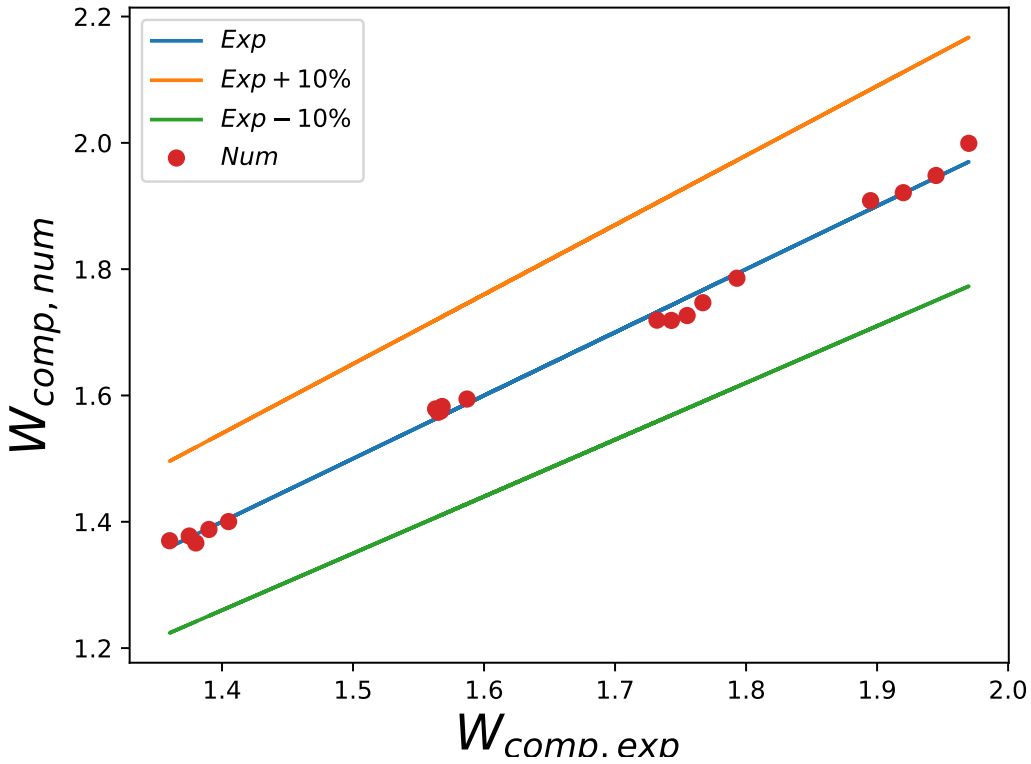

Figure 2: W_{comp} differences between experiments and fitted data

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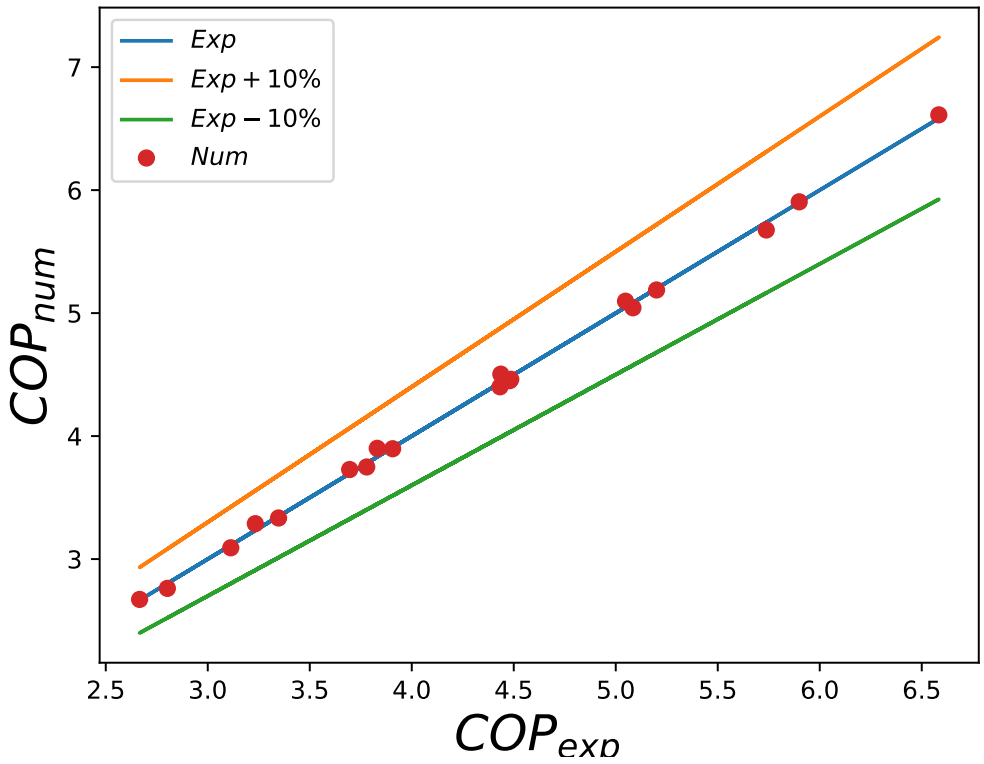

Figure 3: *COP* differences between experiments and fitted data