INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINH-20TE

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*	2.1471e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	1.8546e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	3.1189e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	5.4061e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	3.7373e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-1.5306e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	6.3285e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	6.8230e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-4.8325e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-2.1511e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	5.8348e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	-6.7859e+01
$\dot{m}_{cond}$	3700.00 $[kg/h]$	
$\dot{m}_{evap}$	3700.00 $[kg/h]$	
COP_{nom} (A0W35)	4.41	
$Q_{cond,nom}$ (A0W35)	21.29 $[kW]$	
$Q_{evap,nom}$ (A0W35)	16.46 $[kW]$	
$W_{comp,nom}$ (A0W35)	4.83 $[kW]$	
RMS_{COP}	$4.71e-02$	
$RMS_{Q_{cond}}$	$1.10e-01$	
$RMS_{W_{comp}}$	$8.08e-02$	
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	3.76	3.81	1.3	18.50	18.50	0.0	4.92	4.86	1.33
35.00	0.00	4.46	4.40	1.3	21.54	21.40	0.7	4.83	4.86	0.66
35.00	5.00	5.21	5.19	0.5	24.77	24.85	0.3	4.75	4.79	0.79
50.00	-5.00	2.71	2.66	1.9	17.85	18.03	1.0	6.59	6.78	2.83
50.00	0.00	3.22	3.16	1.9	20.96	20.76	1.0	6.51	6.57	0.96
50.00	5.00	3.79	3.74	1.2	24.27	24.30	0.1	6.41	6.50	1.31
45.00	-5.00	3.10	3.14	1.1	18.15	18.27	0.7	5.85	5.82	0.46
45.00	0.00	3.68	3.69	0.2	21.23	21.08	0.7	5.77	5.72	0.94
45.00	5.00	4.31	4.35	1.1	24.52	24.57	0.2	5.69	5.64	0.88
55.00	0.00	2.72	2.75	1.3	20.62	20.44	0.9	7.59	7.43	2.19
55.00	5.00	3.22	3.27	1.5	23.96	24.02	0.3	7.44	7.35	1.22
35.00	10.00	6.00	6.00	0.1	28.19	28.30	0.4	4.70	4.72	0.48
35.00	15.00	6.83	6.83	0.0	31.80	31.75	0.2	4.66	4.65	0.17
50.00	10.00	4.39	4.34	1.2	27.77	27.83	0.2	6.33	6.42	1.46
50.00	15.00	5.03	4.95	1.7	31.45	31.37	0.3	6.25	6.34	1.43
45.00	10.00	4.97	5.04	1.3	27.99	28.07	0.3	5.63	5.57	1.07
45.00	15.00	5.67	5.74	1.2	31.65	31.56	0.3	5.58	5.50	1.46
55.00	10.00	3.76	3.80	0.9	27.48	27.60	0.4	7.30	7.27	0.44
55.00	15.00	4.34	4.34	0.2	31.19	31.18	0.0	7.18	7.19	0.14
Sum				19.9			7.8			20.24
RMS_{COP}	$4.71e-02$									
$RMS_{Q_{cond}}$	$1.10e-01$									
$RMS_{W_{comp}}$	$8.08e-02$									

Meier/SINH-20TE/SINH-20TE-Qcond.pdf

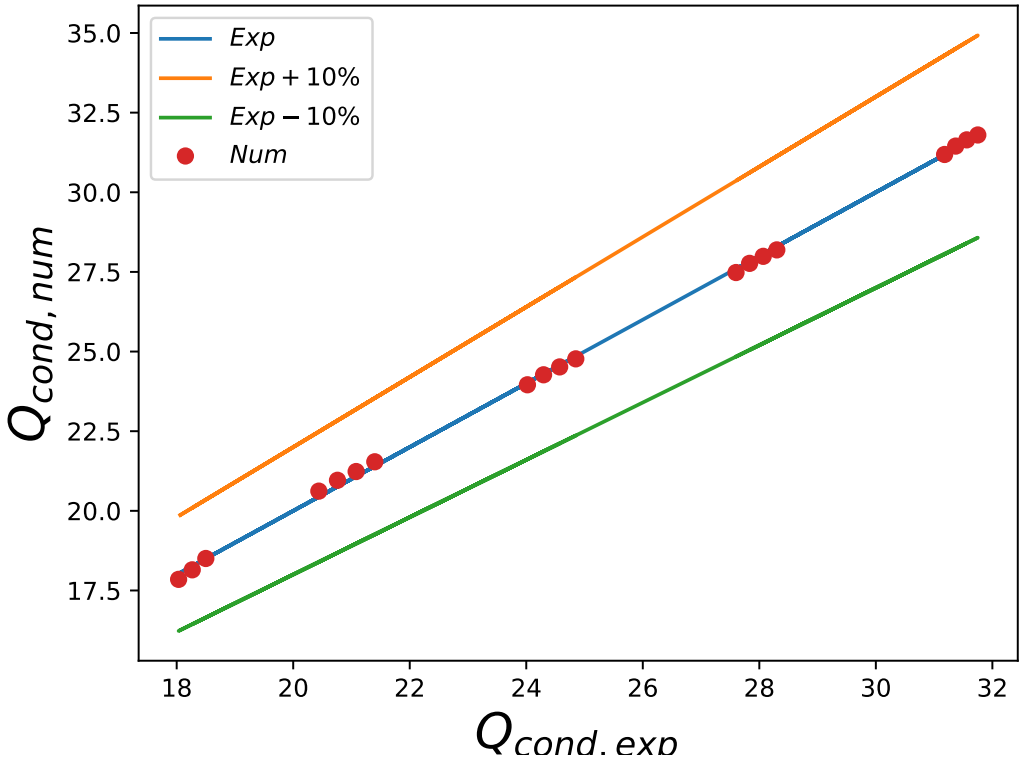

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINH-20TE/SINH-20TE-Qcomp.pdf

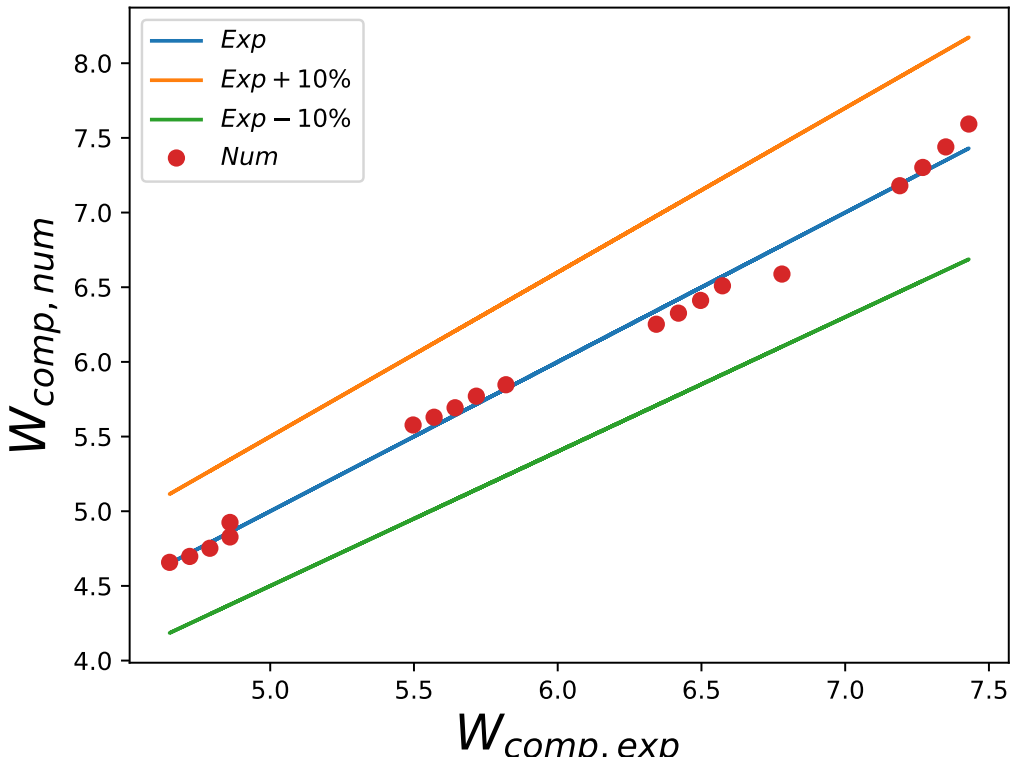

Figure 2: W_{comp} differences between experiments and fitted data

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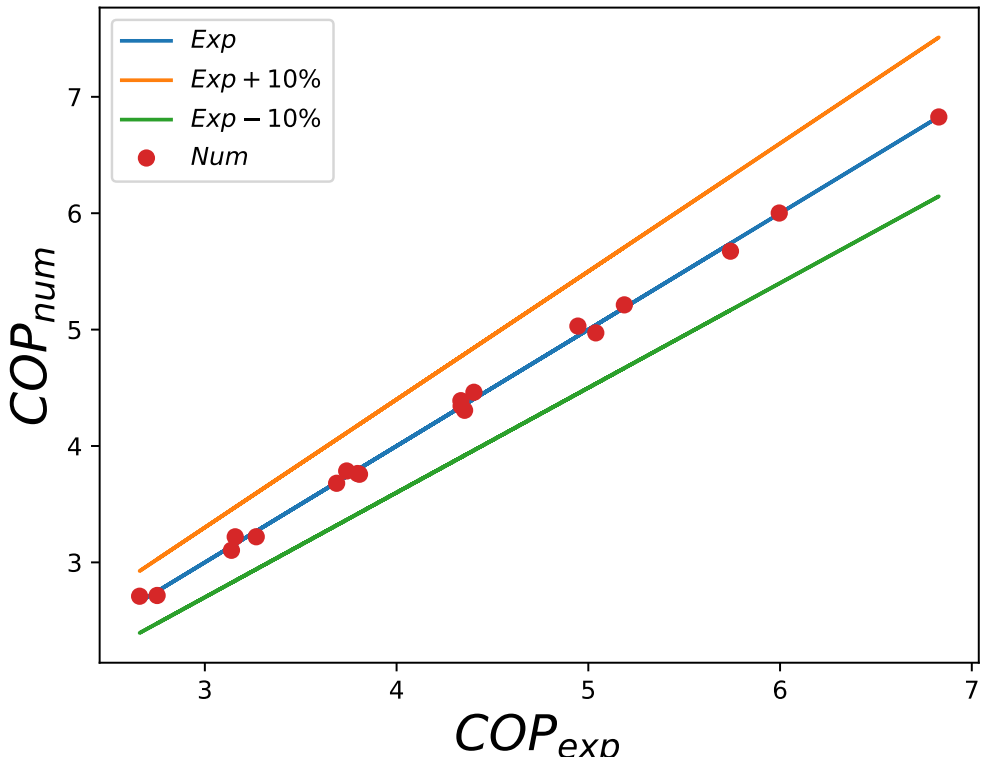

Figure 3: *COP* differences between experiments and fitted data