INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINH-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*	1.0247e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	9.0916e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	2.9121e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	3.1559e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	2.4892e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-1.4976e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.0834e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	3.3206e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	1.0679e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	7.0042e-01
P_{COP_5}	5^{st} *COP polynomial coefficient*	9.4678e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	-1.1670e+02
$\dot{m}_{cond}$	1900.00 $[kg/h]$	
$\dot{m}_{evap}$	1900.00 $[kg/h]$	
COP_{nom} (A0W35)	4.41	
$Q_{cond,nom}$ (A0W35)	10.73 $[kW]$	
$Q_{evap,nom}$ (A0W35)	8.29 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.44 $[kW]$	
RMS_{COP}	$6.01e-02$	
$RMS_{Q_{cond}}$	$3.23e-02$	
$RMS_{W_{comp}}$	$4.03e-02$	
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	3.91	3.80	2.9	9.27	9.20	0.7	2.37	2.42	2.14
35.00	0.00	4.45	4.50	1.2	10.87	10.90	0.3	2.44	2.42	0.89
35.00	5.00	5.04	5.11	1.5	12.47	12.50	0.2	2.48	2.44	1.27
50.00	-5.00	2.63	2.72	3.2	8.52	8.57	0.6	3.24	3.15	2.70
50.00	0.00	3.18	3.07	3.6	10.15	10.11	0.5	3.19	3.29	3.03
50.00	5.00	3.79	3.70	2.2	11.80	11.77	0.3	3.12	3.18	1.91
45.00	-5.00	3.14	3.19	1.6	8.85	8.88	0.3	2.82	2.79	1.33
45.00	0.00	3.68	3.68	0.2	10.48	10.50	0.2	2.85	2.86	0.37
45.00	5.00	4.28	4.32	0.8	12.12	12.13	0.2	2.83	2.81	0.64
55.00	0.00	2.61	2.60	0.1	9.75	9.71	0.4	3.74	3.73	0.29
55.00	5.00	3.22	3.22	0.0	11.40	11.40	0.0	3.54	3.54	0.04
35.00	10.00	5.68	5.71	0.6	14.09	14.10	0.1	2.48	2.47	0.49
35.00	15.00	6.37	6.29	1.2	15.71	15.70	0.1	2.47	2.50	1.08
50.00	10.00	4.44	4.39	1.3	13.46	13.43	0.2	3.03	3.06	1.11
50.00	15.00	5.15	5.12	0.6	15.13	15.10	0.2	2.94	2.95	0.42
45.00	10.00	4.93	4.98	0.9	13.76	13.77	0.1	2.79	2.77	0.83
45.00	15.00	5.63	5.66	0.4	15.41	15.40	0.1	2.74	2.72	0.50
55.00	10.00	3.88	3.90	0.4	13.07	13.10	0.2	3.37	3.36	0.20
55.00	15.00	4.60	4.66	1.3	14.75	14.79	0.3	3.21	3.17	1.04
Sum				24.0			4.8			20.29
RMS_{COP}	$6.01e-02$									
$RMS_{Q_{cond}}$	$3.23e-02$									
$RMS_{W_{comp}}$	$4.03e-02$									

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

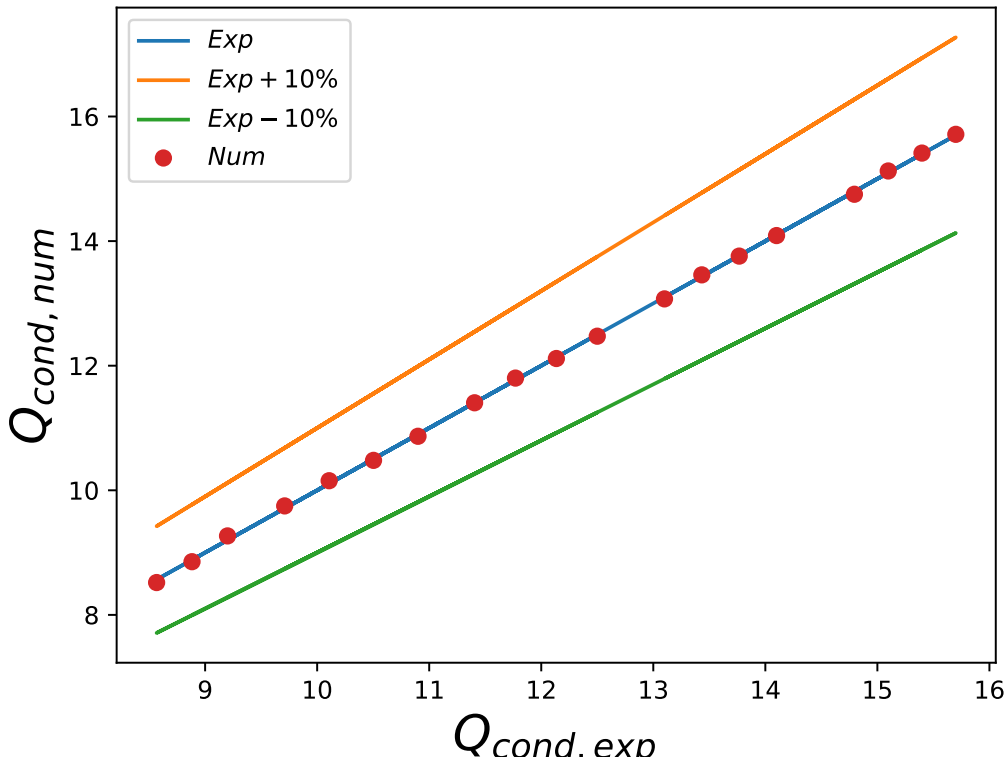

Figure 1: Q_{cond} differences between experiments and fitted data

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

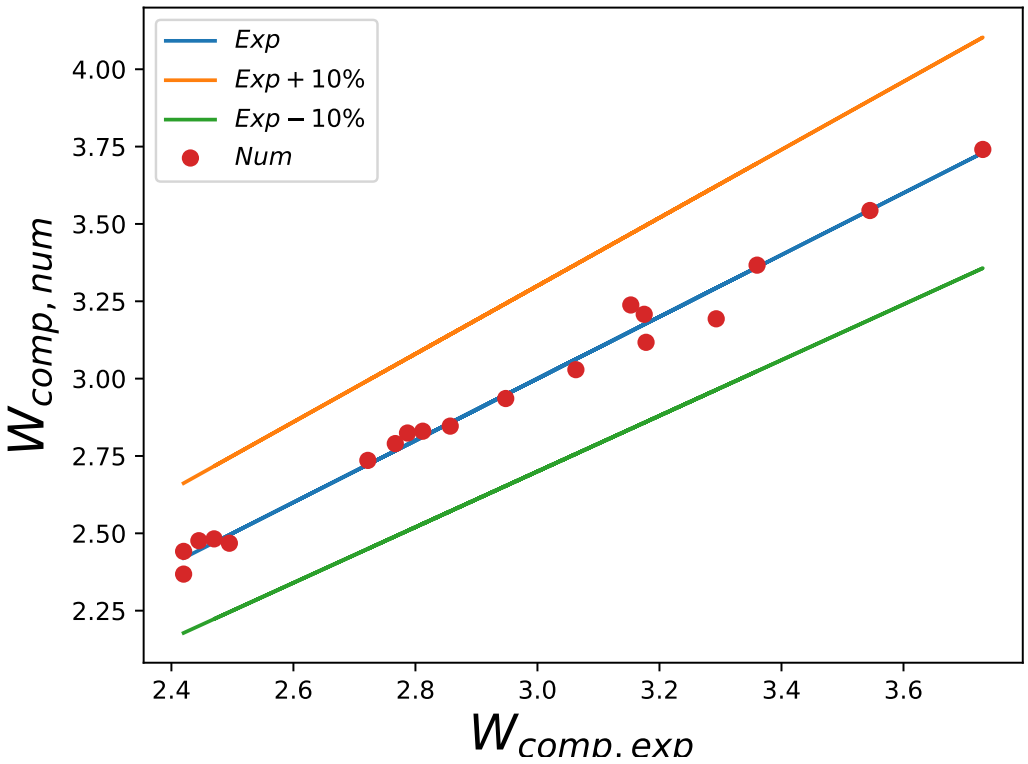

Figure 2: W_{comp} differences between experiments and fitted data

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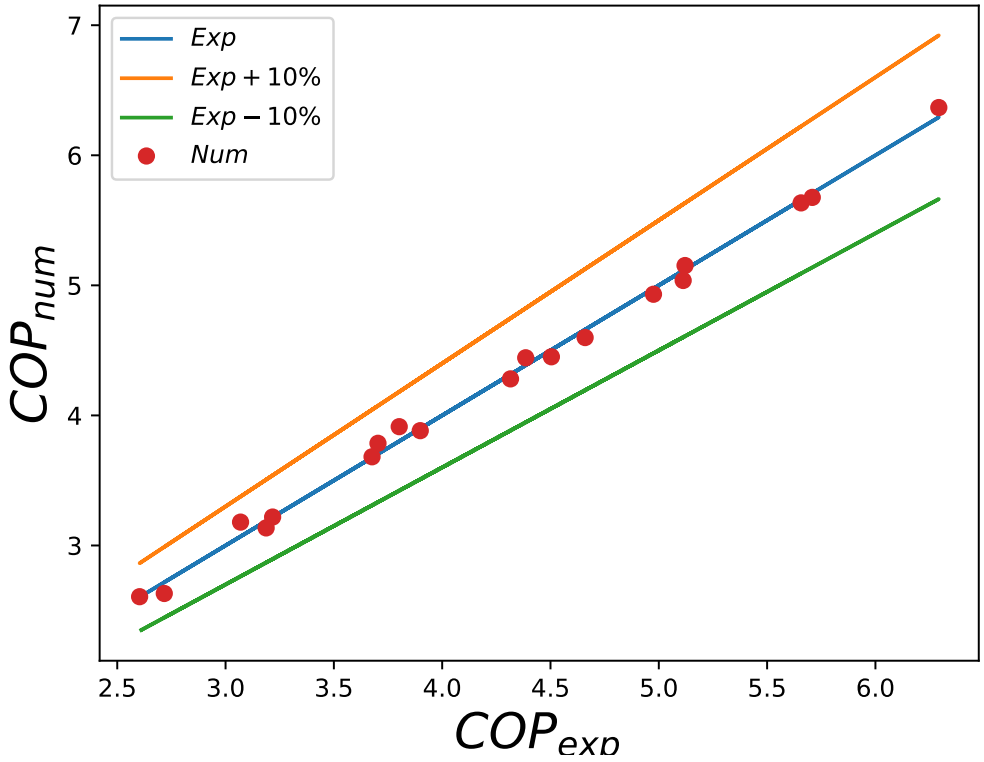

Figure 3: *COP* differences between experiments and fitted data