INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINH-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*	8.7893e+00
P_{Q_2}	2^{st} *condenser polynomial coefficient*	1.0066e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	1.8447e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-1.2643e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	3.0567e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-8.8420e+01
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.6287e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	4.3339e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	3.7308e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-7.5311e+01
P_{COP_5}	5^{st} *COP polynomial coefficient*	1.2561e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	-9.3240e+01
$\dot{m}_{cond}$	1550.00 $[kg/h]$	
$\dot{m}_{evap}$	1550.00 $[kg/h]$	
COP_{nom} (A0W35)	4.45	
$Q_{cond,nom}$ (A0W35)	8.97 $[kW]$	
$Q_{evap,nom}$ (A0W35)	6.96 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.02 $[kW]$	
RMS_{COP}	$4.93e-02$	
$RMS_{Q_{cond}}$	$9.00e-02$	
$RMS_{W_{comp}}$	$2.39e-02$	
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	3.96	3.99	0.7	7.80	7.90	1.3	1.97	1.98	0.55
35.00	0.00	4.48	4.41	1.8	9.08	8.90	2.0	2.02	2.02	0.21
35.00	5.00	5.10	5.12	0.5	10.52	10.55	0.3	2.06	2.06	0.20
50.00	-5.00	2.78	2.78	0.1	7.62	7.69	1.0	2.74	2.77	0.87
50.00	0.00	3.24	3.14	3.2	8.80	8.65	1.7	2.71	2.75	1.49
50.00	5.00	3.81	3.76	1.2	10.15	10.19	0.4	2.67	2.71	1.60
45.00	-5.00	3.23	3.29	1.7	7.73	7.80	0.9	2.39	2.37	0.77
45.00	0.00	3.72	3.68	1.1	8.94	8.78	1.9	2.40	2.39	0.75
45.00	5.00	4.30	4.35	1.1	10.33	10.37	0.4	2.40	2.38	0.72
55.00	0.00	2.71	2.73	0.8	8.61	8.53	0.9	3.17	3.12	1.71
55.00	5.00	3.26	3.30	1.3	9.93	10.02	0.8	3.05	3.04	0.45
35.00	10.00	5.77	5.81	0.6	12.13	12.20	0.6	2.10	2.10	0.01
35.00	15.00	6.51	6.47	0.6	13.88	13.85	0.2	2.13	2.14	0.39
50.00	10.00	4.43	4.40	0.8	11.67	11.73	0.5	2.63	2.67	1.33
50.00	15.00	5.12	5.06	1.2	13.34	13.27	0.5	2.60	2.62	0.72
45.00	10.00	4.94	5.02	1.5	11.87	11.97	0.8	2.40	2.38	0.78
45.00	15.00	5.65	5.69	0.8	13.57	13.56	0.1	2.40	2.38	0.85
55.00	10.00	3.87	3.90	0.8	11.42	11.50	0.7	2.95	2.95	0.10
55.00	15.00	4.54	4.53	0.1	13.06	12.98	0.6	2.88	2.87	0.48
Sum				20.0			15.6			13.96
RMS_{COP}	$4.93e-02$									
$RMS_{Q_{cond}}$	$9.00e-02$									
$RMS_{W_{comp}}$	$2.39e-02$									

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

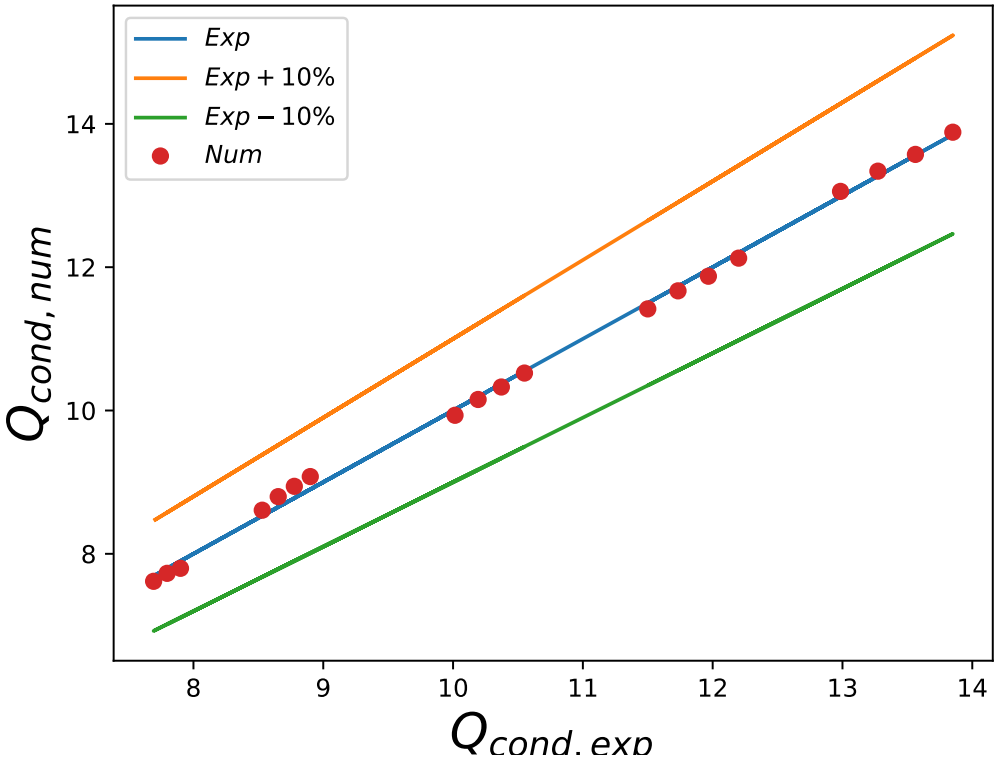

Figure 1: Q_{cond} differences between experiments and fitted data

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

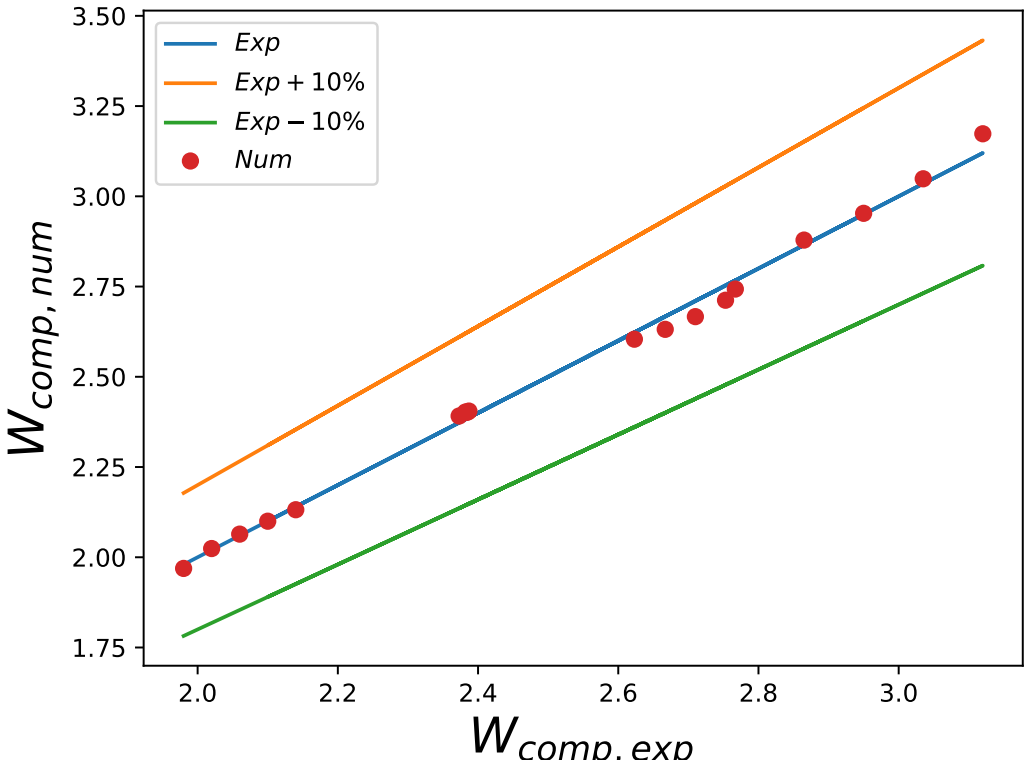

Figure 2: W_{comp} differences between experiments and fitted data

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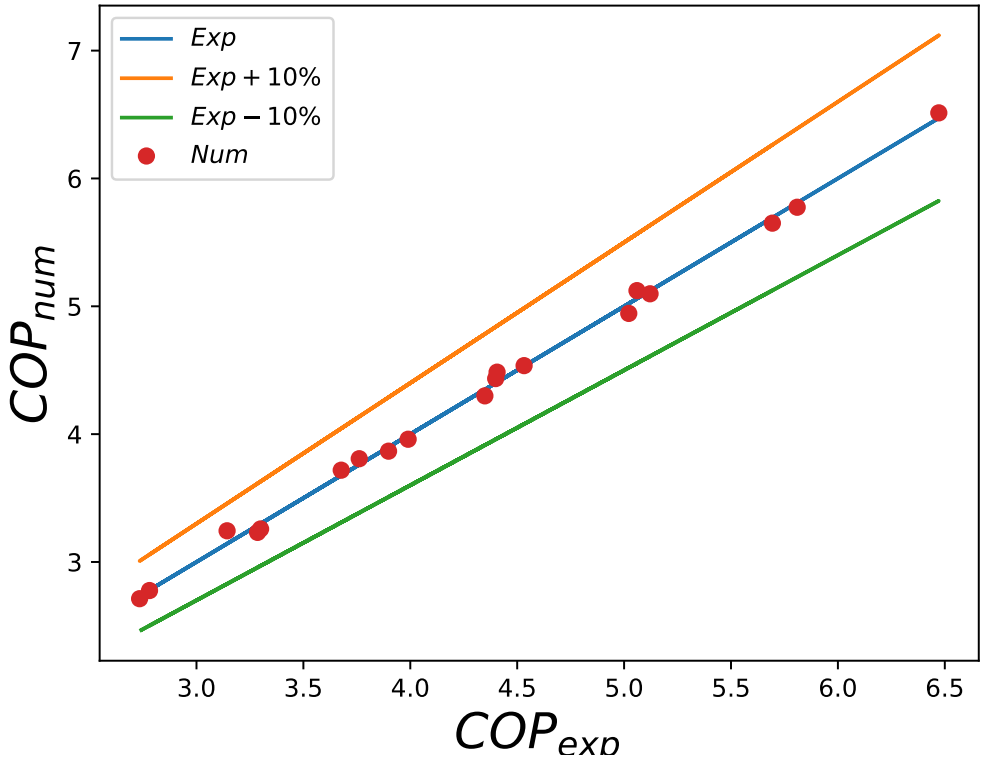

Figure 3: *COP* differences between experiments and fitted data