INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SIN-30TE

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*	2.7878e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	2.9731e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	9.2128e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-4.5257e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	4.0830e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-4.5471e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.9269e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	5.4679e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-2.8169e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-2.0992e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	-2.0439e+00
P_{COP_6}	6^{st} *COP polynomial coefficient*	-7.3062e+01
$\dot{m}_{cond}$	5000.00 $[kg/h]$	
$\dot{m}_{evap}$	5000.00 $[kg/h]$	
COP_{nom} (A0W35)	4.29	
$Q_{cond,nom}$ (A0W35)	30.21 $[kW]$	
$Q_{evap,nom}$ (A0W35)	23.16 $[kW]$	
$W_{comp,nom}$ (A0W35)	7.05 $[kW]$	
RMS_{COP}	$4.15e-02$	
$RMS_{Q_{cond}}$	$1.43e-01$	
$RMS_{W_{comp}}$	$9.47e-02$	
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	3.80	3.80	0.0	26.55	26.60	0.2	6.99	7.00	0.18
35.00	0.00	4.32	4.30	0.6	30.46	30.30	0.5	7.05	7.05	0.04
35.00	5.00	4.86	4.86	0.0	34.61	34.70	0.2	7.12	7.14	0.28
50.00	-5.00	2.77	2.75	0.5	25.11	25.33	0.9	9.07	9.20	1.38
50.00	0.00	3.10	3.03	2.4	28.68	28.37	1.1	9.26	9.38	1.24
50.00	5.00	3.45	3.39	1.6	32.52	32.50	0.1	9.43	9.58	1.54
45.00	-5.00	3.16	3.21	1.4	25.87	25.97	0.4	8.18	8.10	1.03
45.00	0.00	3.56	3.57	0.4	29.56	29.33	0.8	8.31	8.21	1.16
45.00	5.00	3.97	4.02	1.1	33.51	33.60	0.3	8.44	8.36	0.88
55.00	0.00	2.59	2.60	0.5	27.53	27.40	0.5	10.65	10.54	1.01
55.00	5.00	2.87	2.91	1.2	31.28	31.40	0.4	10.89	10.80	0.80
35.00	10.00	5.40	5.40	0.0	39.00	39.10	0.3	7.22	7.24	0.22
35.00	15.00	5.94	5.93	0.2	43.61	43.50	0.2	7.34	7.33	0.05
50.00	10.00	3.80	3.74	1.6	36.60	36.63	0.1	9.63	9.79	1.64
50.00	15.00	4.16	4.08	2.0	40.91	40.77	0.3	9.83	9.99	1.62
45.00	10.00	4.39	4.45	1.3	37.69	37.87	0.5	8.58	8.51	0.84
45.00	15.00	4.81	4.86	1.0	42.10	42.13	0.1	8.75	8.66	0.97
55.00	10.00	3.16	3.20	1.1	35.25	35.40	0.4	11.14	11.06	0.73
55.00	15.00	3.46	3.48	0.6	39.46	39.40	0.2	11.41	11.32	0.76
Sum				17.7			7.4			16.36
RMS_{COP}	$4.15e-02$									
$RMS_{Q_{cond}}$	$1.43e-01$									
$RMS_{W_{comp}}$	$9.47e-02$									

Meier/SIN-30TE/SIN-30TE-Qcond.pdf

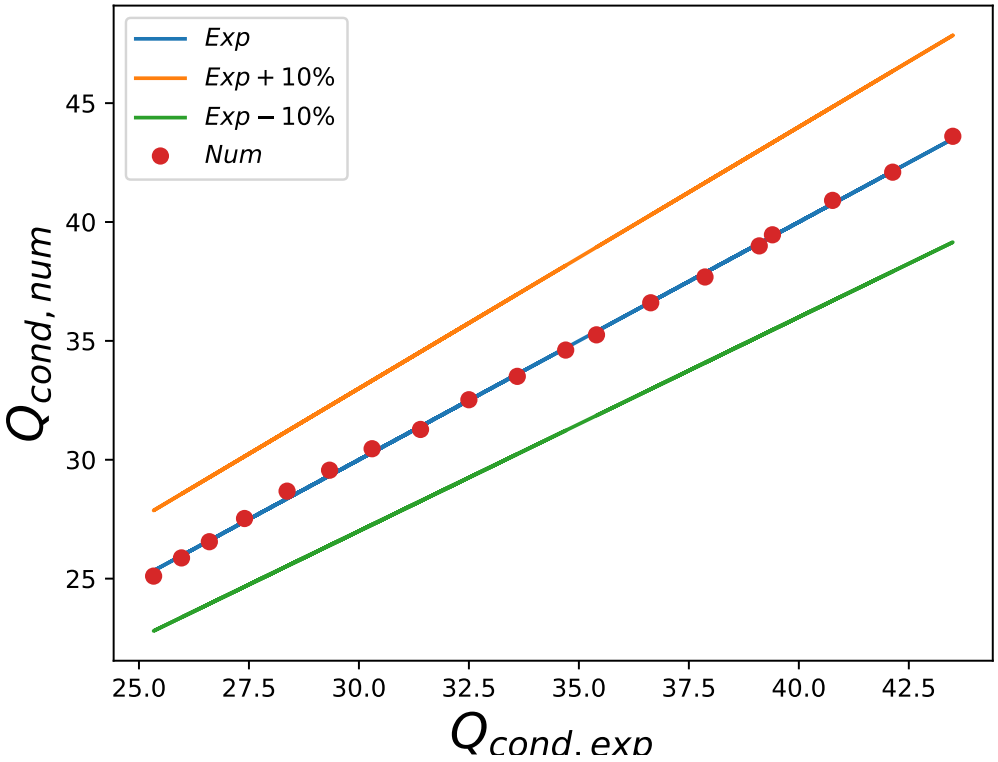

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SIN-30TE/SIN-30TE-Qcomp.pdf

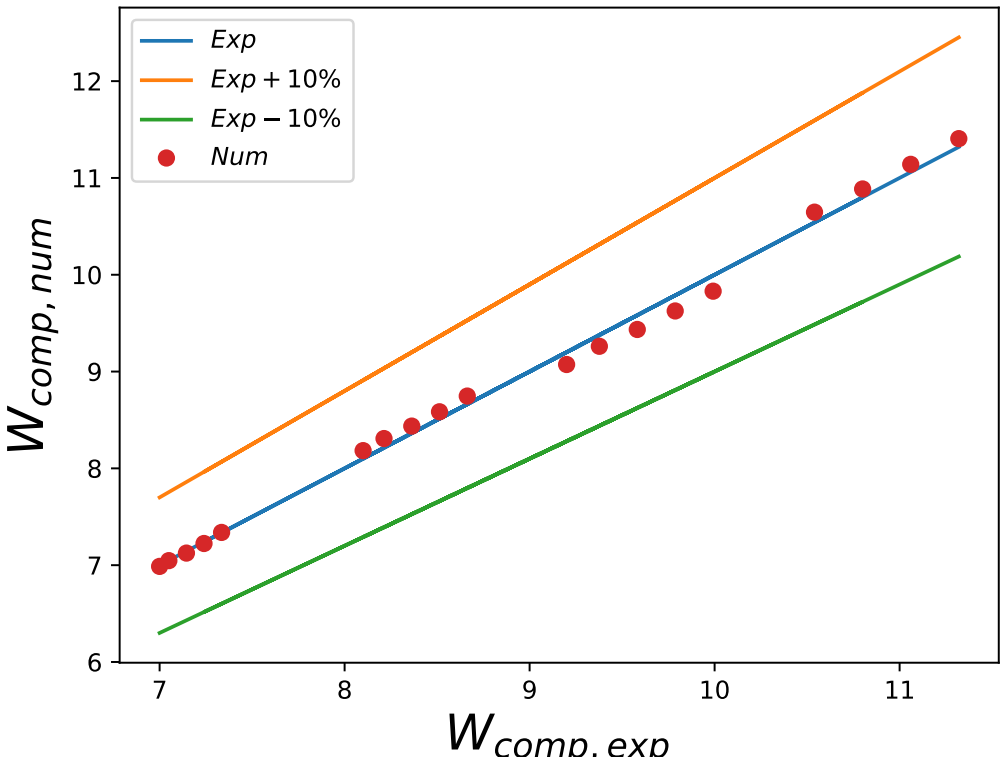

Figure 2: W_{comp} differences between experiments and fitted data

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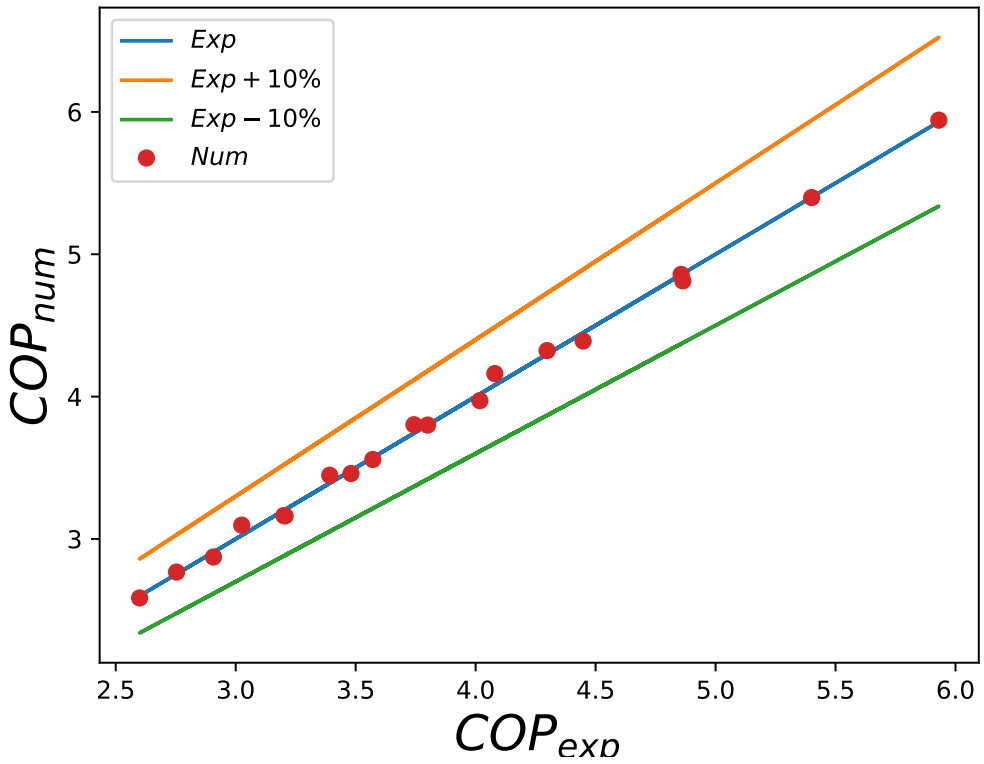

Figure 3: *COP* differences between experiments and fitted data