INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINH-90TU

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*	9.3598e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	8.9027e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	8.4207e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-2.0915e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	-1.0850e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-5.4773e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.2039e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	4.7782e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	4.2360e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-1.0991e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	-1.1073e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	-8.2000e+01
$\dot{m}_{cond}$	15500.00 $[kg/h]$	
$\dot{m}_{evap}$	15500.00 $[kg/h]$	
COP_{nom} (A0W35)	4.22	
$Q_{cond,nom}$ (A0W35)	87.93 $[kW]$	
$Q_{evap,nom}$ (A0W35)	67.10 $[kW]$	
$W_{comp,nom}$ (A0W35)	20.84 $[kW]$	
RMS_{COP}	$3.73e-02$	
$RMS_{Q_{cond}}$	$4.01e-01$	
$RMS_{W_{comp}}$	$2.47e-01$	
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	3.62	3.60	0.5	74.69	75.50	1.1	20.64	20.97	1.59
35.00	0.00	4.27	4.30	0.7	89.25	88.60	0.7	20.89	20.60	1.40
35.00	5.00	4.88	4.87	0.2	103.80	103.40	0.4	21.29	21.25	0.22
50.00	-5.00	2.69	2.64	1.7	71.50	70.50	1.4	26.62	26.70	0.31
50.00	0.00	3.26	3.24	0.5	85.96	86.13	0.2	26.40	26.59	0.71
50.00	5.00	3.77	3.70	1.7	100.40	100.43	0.0	26.66	27.12	1.69
45.00	-5.00	3.05	3.06	0.3	72.85	73.00	0.2	23.86	23.83	0.10
45.00	0.00	3.65	3.70	1.4	87.35	87.37	0.0	23.93	23.59	1.44
45.00	5.00	4.19	4.21	0.6	101.83	101.92	0.1	24.30	24.18	0.48
55.00	0.00	2.81	2.87	2.1	84.34	84.90	0.7	30.01	29.58	1.45
55.00	5.00	3.29	3.29	0.2	98.71	98.95	0.2	30.04	30.06	0.07
35.00	10.00	5.42	5.40	0.4	118.31	118.20	0.1	21.82	21.89	0.30
35.00	15.00	5.91	5.90	0.1	132.78	133.00	0.2	22.46	22.54	0.31
50.00	10.00	4.22	4.15	1.7	114.80	114.73	0.1	27.22	27.66	1.59
50.00	15.00	4.61	4.58	0.8	129.18	129.03	0.1	28.00	28.19	0.69
45.00	10.00	4.68	4.70	0.5	116.27	116.47	0.2	24.87	24.77	0.38
45.00	15.00	5.10	5.17	1.2	130.69	131.02	0.3	25.60	25.36	0.95
55.00	10.00	3.71	3.70	0.2	113.07	113.00	0.1	30.51	30.54	0.09
55.00	15.00	4.07	4.10	0.7	127.41	127.05	0.3	31.31	31.02	0.95
Sum				15.4			6.3			14.72
RMS_{COP}	$3.73e-02$									
$RMS_{Q_{cond}}$	$4.01e-01$									
$RMS_{W_{comp}}$	$2.47e-01$									

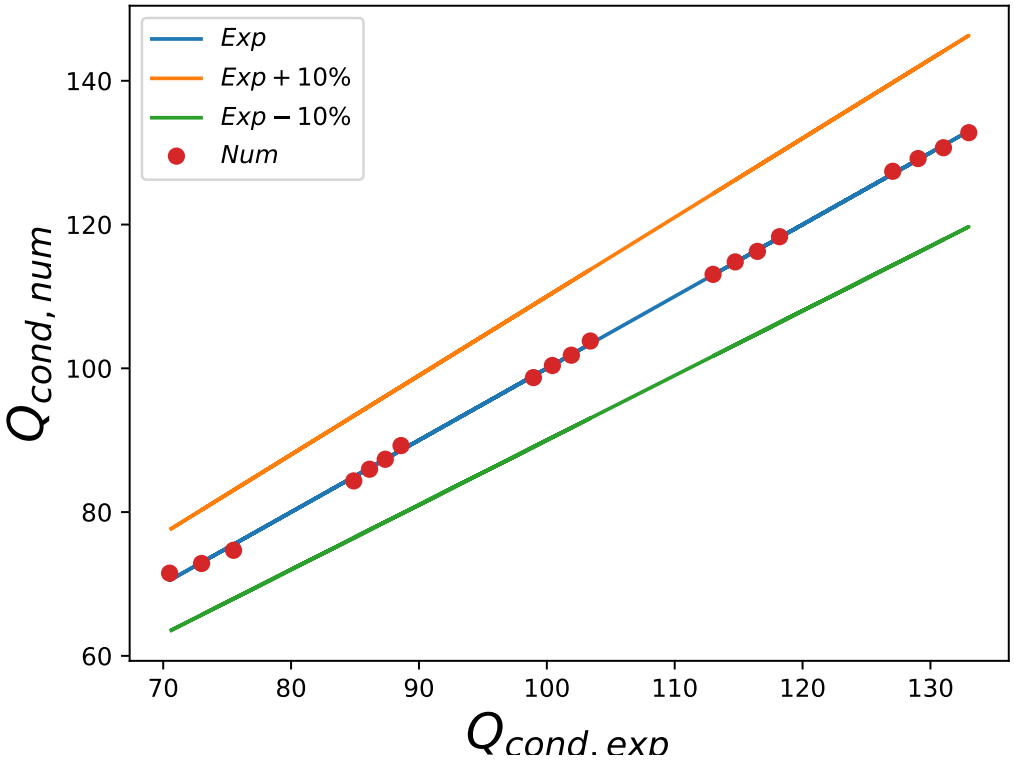

Figure 1: Q_{cond} differences between experiments and fitted data

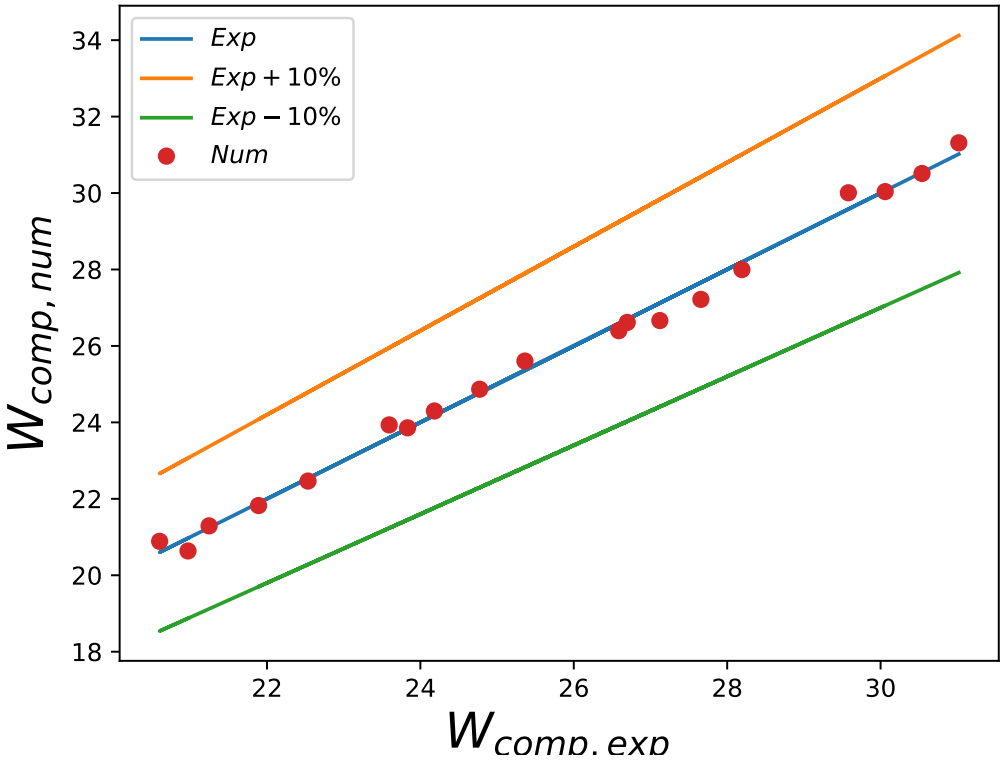

Figure 2: W_{comp} differences between experiments and fitted data

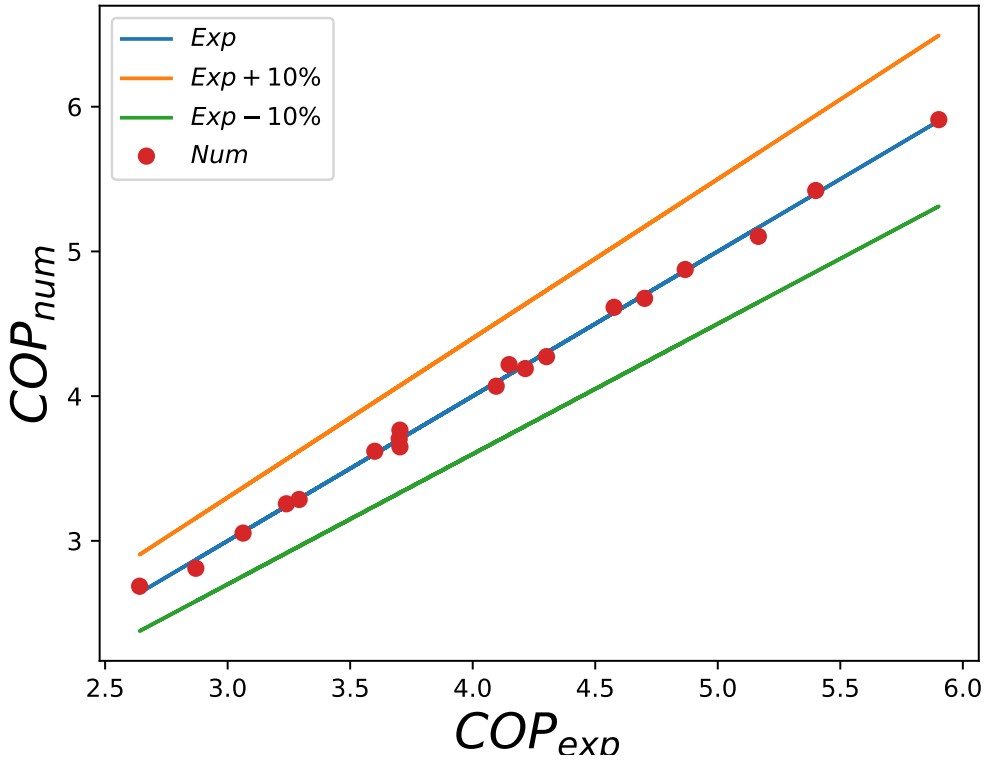

Figure 3: COP differences between experiments and fitted data