INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SIN-6TU

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*	5.7227e+00
P_{Q_2}	2^{st} *condenser polynomial coefficient*	5.7862e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	1.7105e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-5.8641e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	5.0943e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-8.7032e+01
P_{COP_1}	1^{st} *COP polynomial coefficient*	6.4542e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	6.2041e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-3.1154e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-2.2610e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	-5.4317e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	-7.9441e+01
$\dot{m}_{cond}$	1050.00 $[kg/h]$	
$\dot{m}_{evap}$	1050.00 $[kg/h]$	
COP_{nom} (A0W35)	4.63	
$Q_{cond,nom}$ (A0W35)	6.06 $[kW]$	
$Q_{evap,nom}$ (A0W35)	4.76 $[kW]$	
$W_{comp,nom}$ (A0W35)	1.31 $[kW]$	
RMS_{COP}	$4.45e-02$	
$RMS_{Q_{cond}}$	$1.93e-02$	
$RMS_{W_{comp}}$	$1.82e-02$	
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	4.03	4.00	0.8	5.29	5.30	0.2	1.31	1.32	0.99
35.00	0.00	4.68	4.69	0.3	6.13	6.10	0.4	1.31	1.30	0.77
35.00	5.00	5.30	5.30	0.0	6.99	7.00	0.1	1.32	1.32	0.10
50.00	-5.00	2.90	2.88	0.5	4.95	4.97	0.4	1.71	1.72	0.92
50.00	0.00	3.34	3.28	1.9	5.74	5.70	0.8	1.72	1.74	1.10
50.00	5.00	3.76	3.69	2.0	6.57	6.57	0.1	1.75	1.78	1.83
45.00	-5.00	3.33	3.37	1.1	5.12	5.13	0.3	1.54	1.52	0.79
45.00	0.00	3.84	3.88	1.1	5.93	5.90	0.4	1.54	1.52	1.50
45.00	5.00	4.33	4.38	1.0	6.77	6.78	0.2	1.56	1.55	0.75
55.00	0.00	2.78	2.81	0.9	5.51	5.50	0.2	1.98	1.96	1.12
55.00	5.00	3.14	3.16	0.7	6.33	6.35	0.3	2.02	2.01	0.42
35.00	10.00	5.91	5.90	0.2	7.89	7.90	0.2	1.34	1.34	0.32
35.00	15.00	6.48	6.47	0.2	8.81	8.80	0.1	1.36	1.36	0.08
50.00	10.00	4.16	4.08	1.9	7.43	7.43	0.0	1.79	1.82	1.88
50.00	15.00	4.54	4.46	1.7	8.32	8.30	0.3	1.83	1.86	1.43
45.00	10.00	4.80	4.85	1.0	7.64	7.67	0.4	1.59	1.58	0.66
45.00	15.00	5.25	5.31	1.1	8.54	8.55	0.1	1.63	1.61	1.04
55.00	10.00	3.47	3.50	0.8	7.18	7.20	0.3	2.07	2.06	0.50
55.00	15.00	3.78	3.82	1.0	8.06	8.05	0.1	2.13	2.11	1.15
Sum				18.4			5.0			17.35
RMS_{COP}	$4.45e-02$									
$RMS_{Q_{cond}}$	$1.93e-02$									
$RMS_{W_{comp}}$	$1.82e-02$									

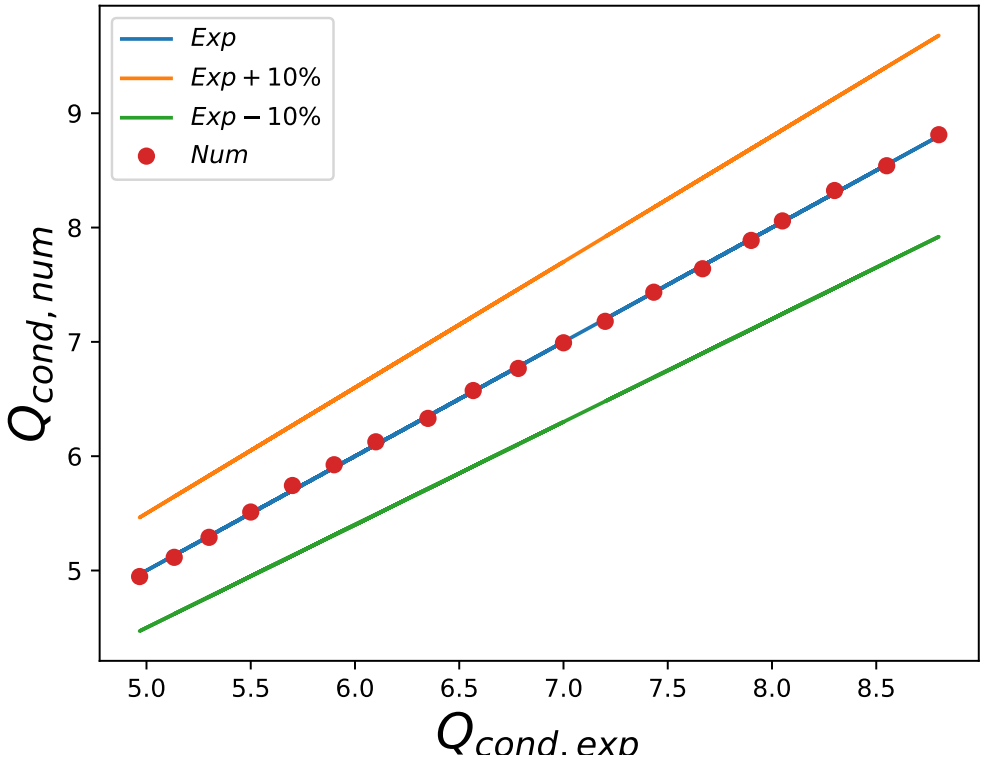

Figure 1: Q_{cond} differences between experiments and fitted data

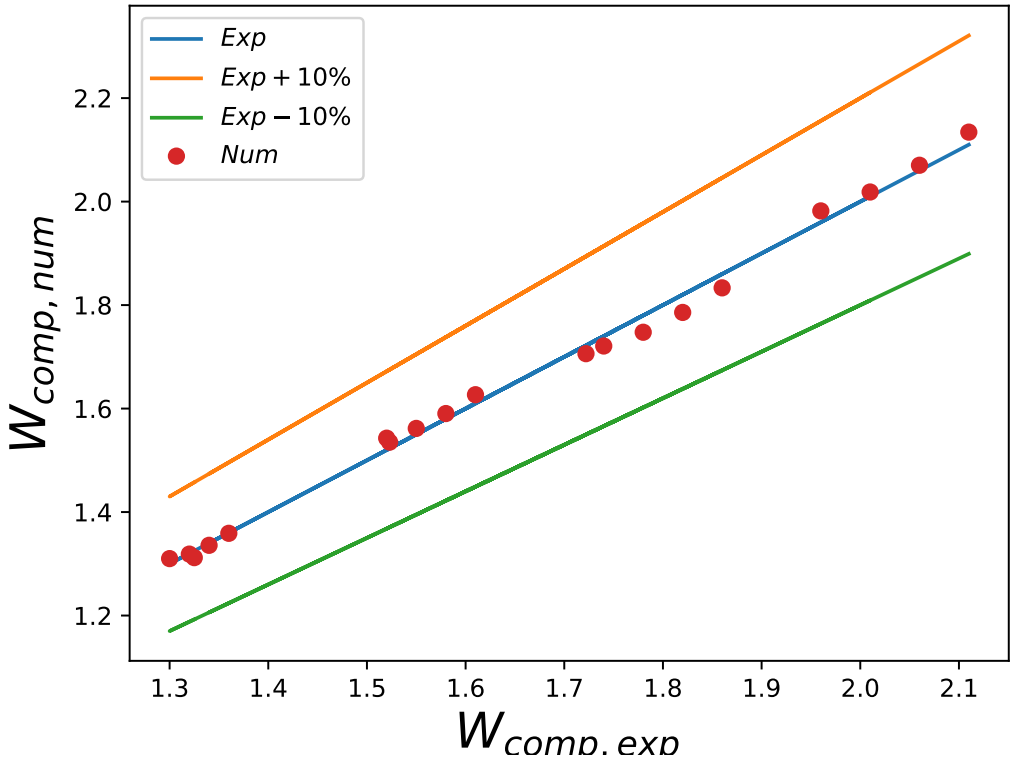

Figure 2: W_{comp} differences between experiments and fitted data

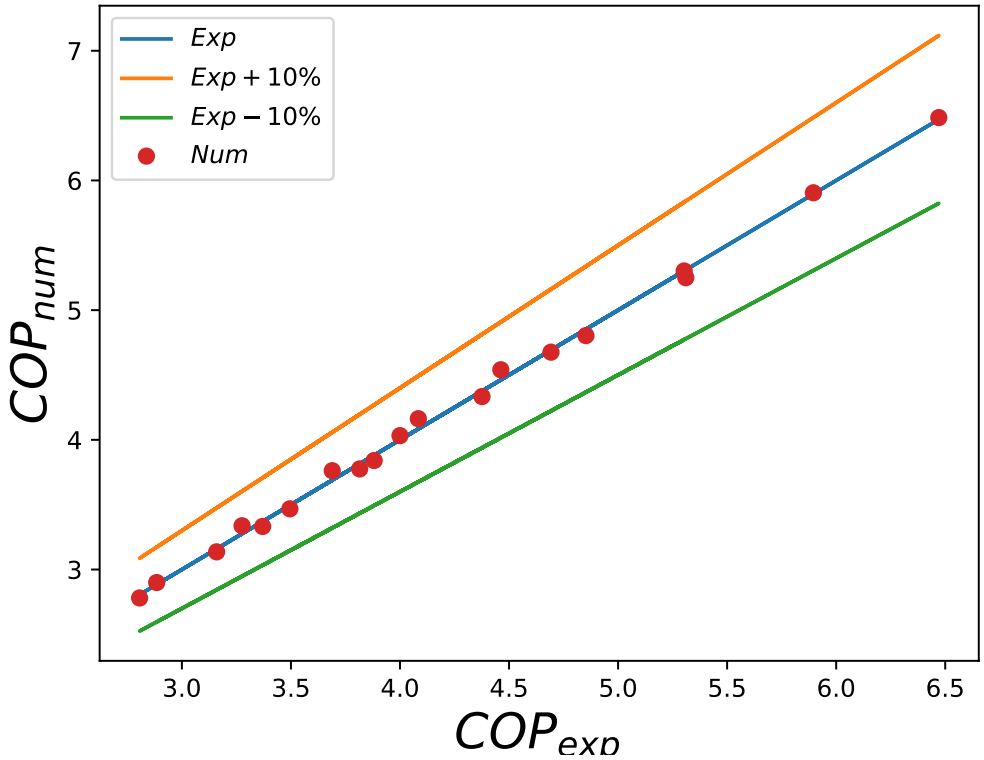

Figure 3: COP differences between experiments and fitted data