INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINK-7TE

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*	6.7730e+00
P_{Q_2}	2^{st} *condenser polynomial coefficient*	6.1529e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	1.1538e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	2.4830e-01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	-6.0042e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-6.4057e+01
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.6238e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	4.4616e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	8.5794e-01
P_{COP_4}	4^{st} *COP polynomial coefficient*	-1.9295e+01
P_{COP_5}	5^{st} *COP polynomial coefficient*	-9.4036e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	-8.2550e+01
$\dot{m}_{cond}$	1200.00 $[kg/h]$	
$\dot{m}_{evap}$	1200.00 $[kg/h]$	
COP_{nom} (A0W35)	4.16	
$Q_{cond,nom}$ (A0W35)	6.67 $[kW]$	
$Q_{evap,nom}$ (A0W35)	5.07 $[kW]$	
$W_{comp,nom}$ (A0W35)	1.60 $[kW]$	
RMS_{COP}	$6.01e-02$	
$RMS_{Q_{cond}}$	$1.73e-02$	
$RMS_{W_{comp}}$	$3.54e-02$	
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	3.45	3.41	1.1	5.71	5.70	0.2	1.66	1.67	0.85
35.00	0.00	4.23	4.30	1.6	6.78	6.80	0.3	1.60	1.58	1.32
35.00	5.00	4.96	4.95	0.2	7.81	7.80	0.2	1.57	1.57	0.08
50.00	-5.00	2.24	2.16	3.5	5.40	5.37	0.6	2.41	2.48	2.82
50.00	0.00	3.00	3.02	0.7	6.45	6.47	0.2	2.15	2.14	0.52
50.00	5.00	3.71	3.63	2.4	7.48	7.47	0.2	2.02	2.06	2.08
45.00	-5.00	2.69	2.66	1.0	5.53	5.53	0.0	2.06	2.08	1.00
45.00	0.00	3.46	3.57	2.9	6.60	6.63	0.6	1.90	1.86	2.39
45.00	5.00	4.18	4.20	0.4	7.63	7.63	0.0	1.82	1.82	0.36
55.00	0.00	2.49	2.60	4.4	6.28	6.30	0.3	2.52	2.42	4.25
55.00	5.00	3.19	3.17	0.6	7.30	7.30	0.1	2.29	2.30	0.55
35.00	10.00	5.65	5.61	0.7	8.82	8.80	0.2	1.56	1.57	0.52
35.00	15.00	6.28	6.26	0.2	9.79	9.80	0.1	1.56	1.56	0.32
50.00	10.00	4.38	4.28	2.3	8.49	8.47	0.3	1.94	1.98	1.99
50.00	15.00	5.00	5.00	0.1	9.47	9.47	0.0	1.89	1.90	0.11
45.00	10.00	4.86	4.87	0.2	8.64	8.63	0.1	1.78	1.77	0.28
45.00	15.00	5.48	5.57	1.5	9.62	9.63	0.2	1.75	1.73	1.38
55.00	10.00	3.86	3.81	1.3	8.31	8.30	0.1	2.16	2.18	1.14
55.00	15.00	4.47	4.51	1.0	9.29	9.30	0.1	2.08	2.06	0.84
Sum				26.3			3.8			22.80
RMS_{COP}	$6.01e-02$									
$RMS_{Q_{cond}}$	$1.73e-02$									
$RMS_{W_{comp}}$	$3.54e-02$									

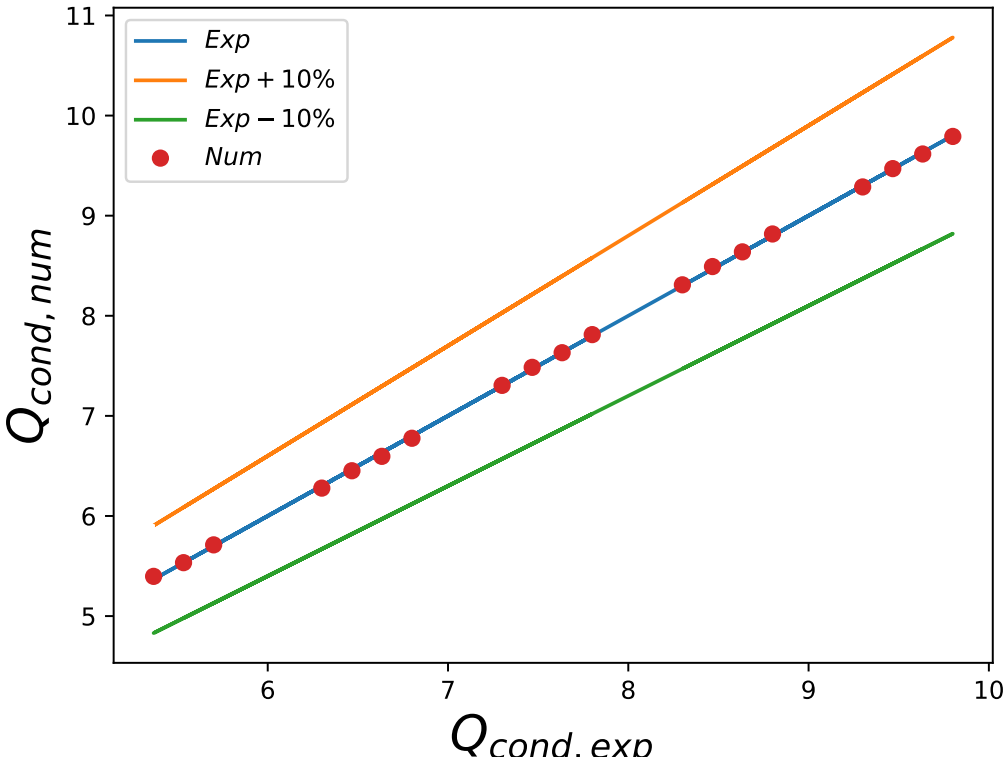

Figure 1: Q_{cond} differences between experiments and fitted data

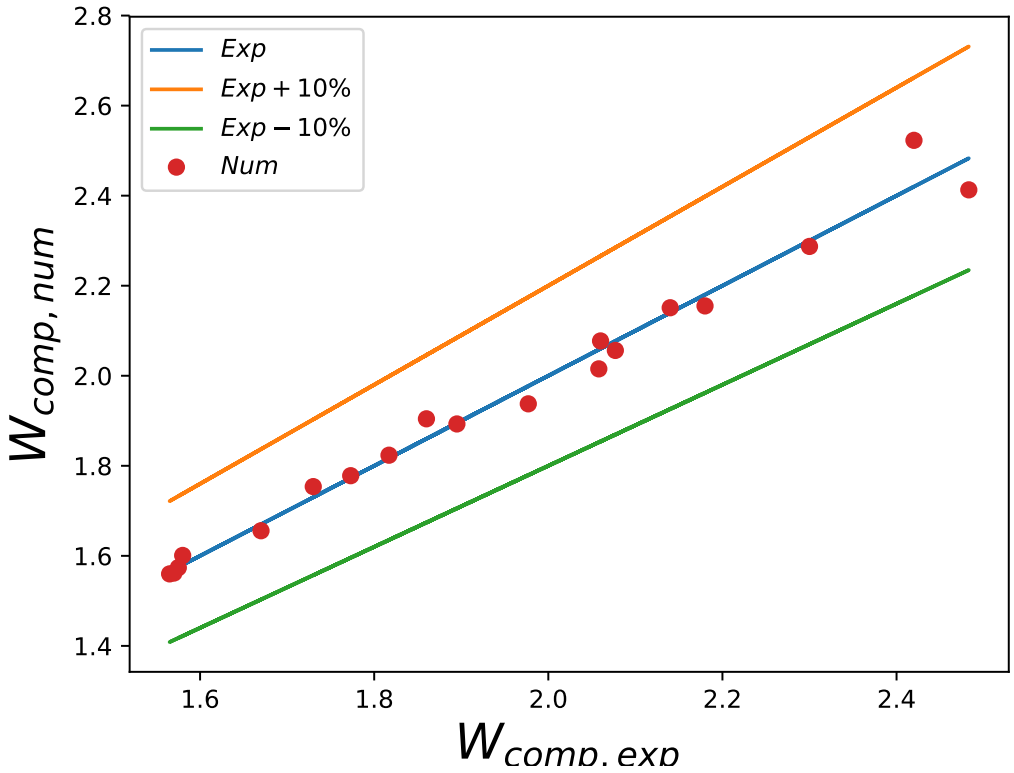

Figure 2: W_{comp} differences between experiments and fitted data

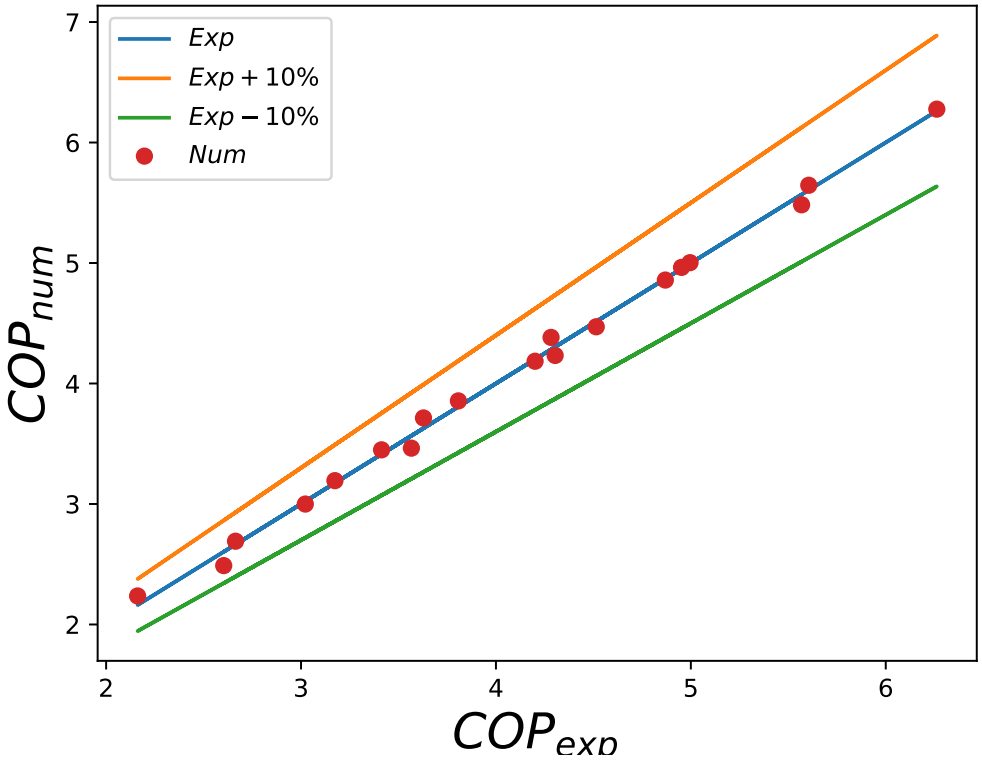

Figure 3: COP differences between experiments and fitted data