INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump HPP14L-K-BC

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*	1.5433e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	1.4721e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	3.8866e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-5.6908e+01
P_{Q_5}	5^{st} *condenser polynomial coefficient*	2.2140e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-2.7359e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	8.0164e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	6.0069e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-3.2973e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	-2.0689e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	5.8343e+01
P_{COP_6}	6^{st} *COP polynomial coefficient*	1.6442e+01
$\dot{m}_{cond}$	3200.00 $[kg/h]$	
$\dot{m}_{evap}$	8000.00 $[kg/h]$	
COP_{nom} (A0W35)	4.01	
$Q_{cond,nom}$ (A0W35)	14.92 $[kW]$	
$Q_{evap,nom}$ (A0W35)	11.19 $[kW]$	
$W_{comp,nom}$ (A0W35)	3.72 $[kW]$	
RMS_{COP}	$9.43e-02$	
$RMS_{Q_{cond}}$	$3.65e-01$	
$RMS_{W_{comp}}$	$9.11e-02$	
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	20.00	6.73	6.81	1.2	25.25	25.20	0.2	3.75	3.70	1.37
35.00	10.00	5.30	5.26	0.7	19.94	20.16	1.1	3.76	3.83	1.76
35.00	7.00	4.90	4.95	1.0	18.43	18.82	2.0	3.76	3.80	1.03
35.00	2.00	4.23	4.06	4.3	15.99	15.34	4.2	3.78	3.78	0.10
35.00	-7.00	3.20	3.20	0.1	11.93	11.81	1.0	3.73	3.69	1.05
35.00	-15.00	2.38	2.48	4.2	8.63	8.86	2.6	3.63	3.57	1.71
45.00	7.00	3.76	3.74	0.4	17.24	17.41	1.0	4.59	4.65	1.32
45.00	2.00	3.23	3.11	3.7	14.79	14.29	3.5	4.58	4.59	0.14
45.00	-7.00	2.41	2.37	1.9	10.73	10.54	1.8	4.44	4.45	0.13
45.00	-15.00	1.80	1.79	0.3	7.44	7.74	3.9	4.14	4.32	4.23
50.00	20.00	4.54	4.44	2.2	23.21	22.87	1.5	5.11	5.15	0.71
50.00	15.00	4.02	4.15	3.2	20.54	21.17	3.0	5.11	5.10	0.16
50.00	7.00	3.21	3.39	5.3	16.41	16.92	3.0	5.11	4.99	2.42
50.00	2.00	2.74	2.76	0.9	13.94	13.59	2.6	5.09	4.92	3.51
50.00	-7.00	2.03	2.04	0.3	9.87	9.71	1.6	4.85	4.76	1.88
55.00	20.00	3.82	3.71	3.1	22.19	21.81	1.8	5.80	5.88	1.30
55.00	7.00	2.66	2.77	4.1	15.40	15.86	2.9	5.79	5.72	1.20
55.00	-7.00	1.66	1.57	5.5	8.82	8.65	2.0	5.32	5.50	3.35
Sum				42.2			39.6			27.37
RMS_{COP}	$9.43e-02$									
$RMS_{Q_{cond}}$	$3.65e-01$									
$RMS_{W_{comp}}$	$9.11e-02$									

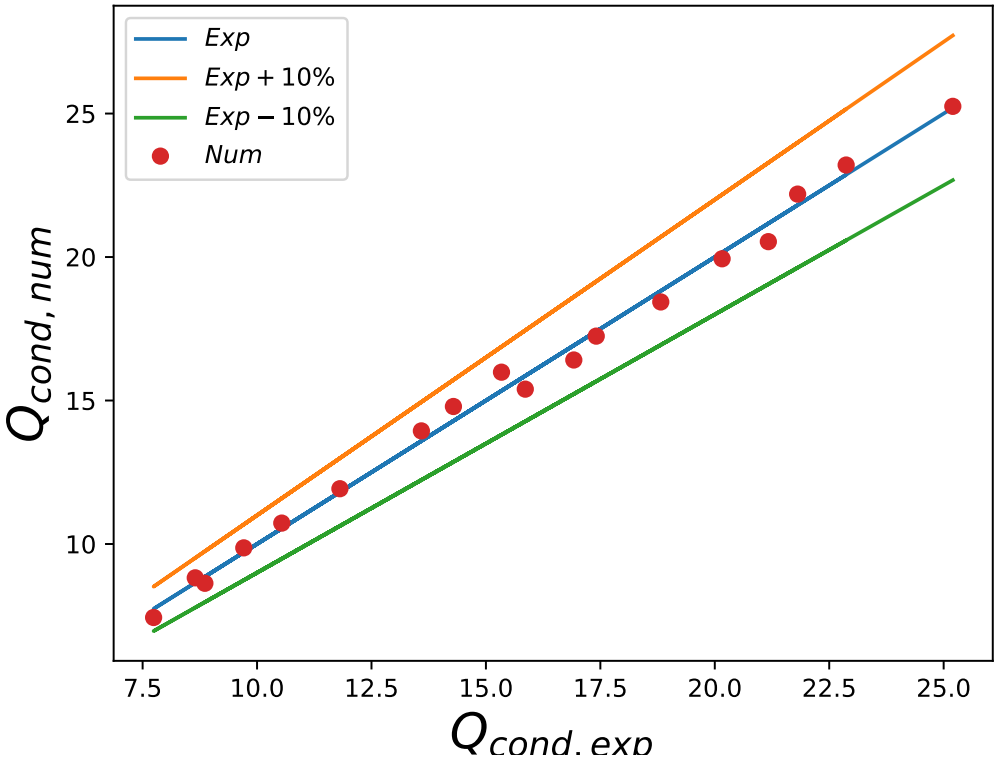

Figure 1: Q_{cond} differences between experiments and fitted data

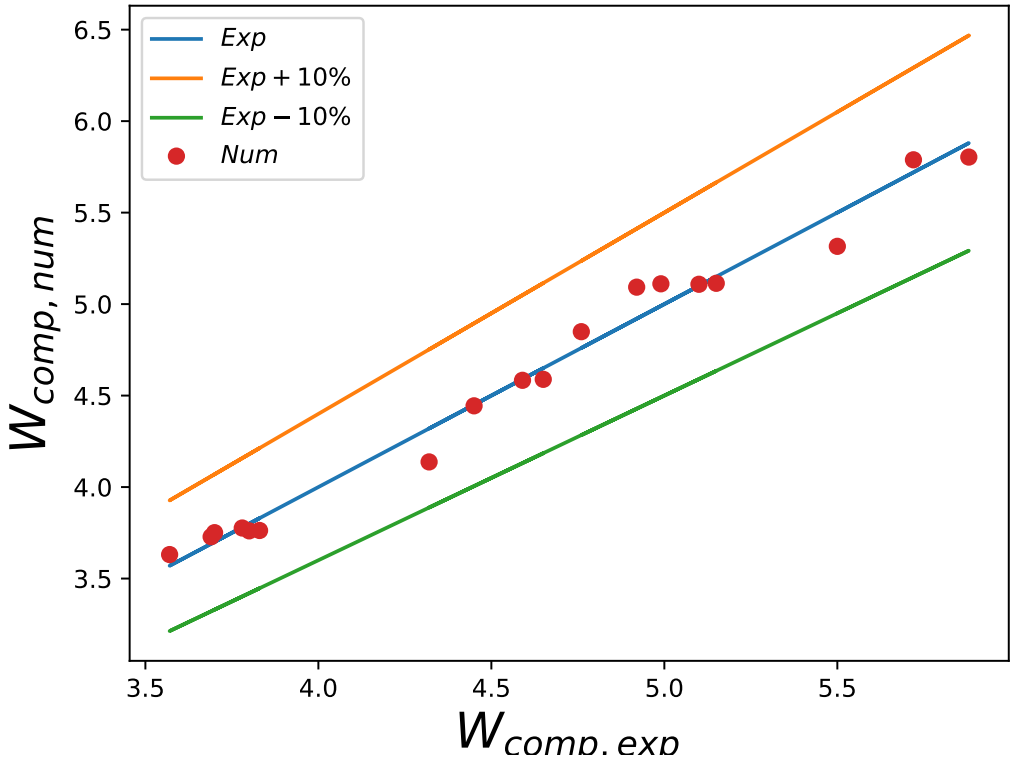

Figure 2: W_{comp} differences between experiments and fitted data

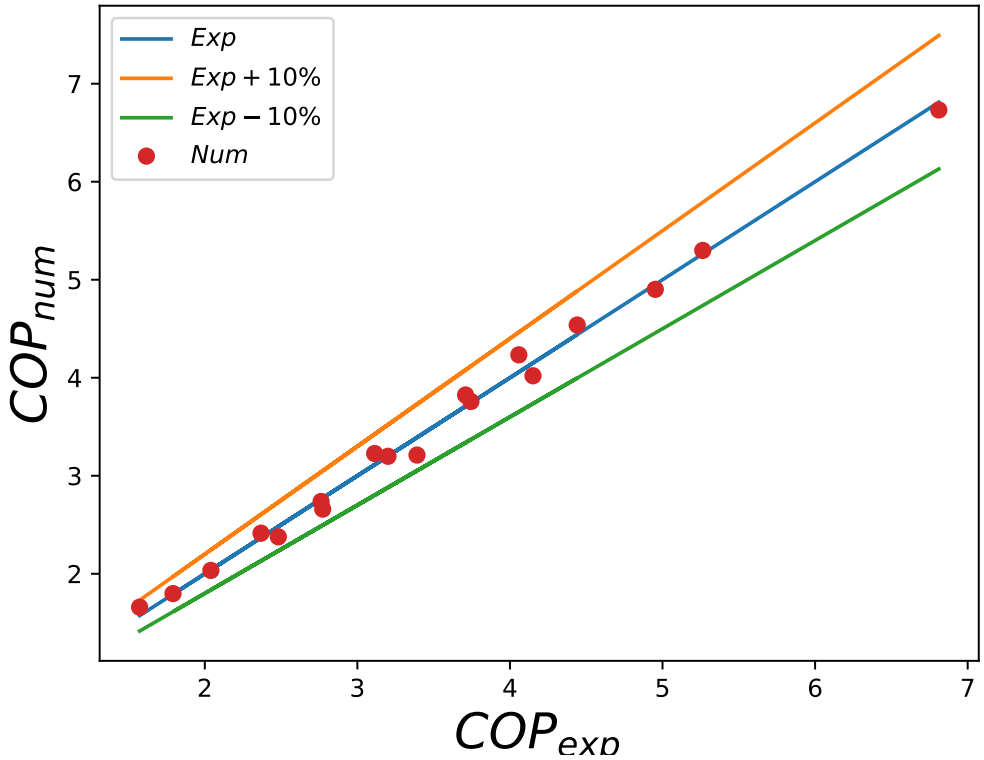

Figure 3: COP differences between experiments and fitted data