INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SIN-22TU

Parametric Heat Pump calculation

Dani Carbonell
dani.carbonell@spf.ch

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	$[kW]$
P_{Q_1}	1^{st} *condenser polynomial coefficient*	2.2267e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	2.0015e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	4.1062e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-2.4655e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	-2.0174e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-2.1232e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.6654e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	3.5744e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	3.3127e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-7.4772e+01
P_{COP_5}	5^{st} *COP polynomial coefficient*	-1.5825e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	-8.9463e+01
$\dot{m}_{cond}$	4000.00 $[kg/h]$	
$\dot{m}_{evap}$	4000.00 $[kg/h]$	
COP_{nom} (A0W35)	4.53	
$Q_{cond,nom}$ (A0W35)	22.57 $[kW]$	
$Q_{evap,nom}$ (A0W35)	17.59 $[kW]$	
$W_{comp,nom}$ (A0W35)	4.98 $[kW]$	
RMS_{COP}	$6.22e-02$	
$RMS_{Q_{cond}}$	$6.59e-02$	
$RMS_{W_{comp}}$	$8.49e-02$	
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	4.01	3.90	2.9	19.80	19.80	0.0	4.94	5.08	2.83
35.00	0.00	4.57	4.70	2.7	22.82	22.90	0.4	4.99	4.87	2.42
35.00	5.00	5.05	5.06	0.3	25.74	25.70	0.2	5.10	5.08	0.48
50.00	-5.00	2.86	2.86	0.3	19.10	19.00	0.5	6.67	6.65	0.26
50.00	0.00	3.36	3.35	0.5	21.92	21.97	0.2	6.51	6.56	0.74
50.00	5.00	3.77	3.67	2.6	24.63	24.57	0.3	6.53	6.68	2.29
45.00	-5.00	3.30	3.31	0.1	19.46	19.40	0.3	5.89	5.87	0.36
45.00	0.00	3.83	3.92	2.4	22.35	22.43	0.4	5.84	5.72	2.10
45.00	5.00	4.26	4.27	0.4	25.13	25.13	0.0	5.90	5.88	0.37
55.00	0.00	2.84	2.90	2.0	21.37	21.50	0.6	7.51	7.41	1.41
55.00	5.00	3.22	3.20	0.6	24.01	24.00	0.0	7.44	7.49	0.61
35.00	10.00	5.43	5.40	0.7	28.57	28.50	0.2	5.26	5.28	0.43
35.00	15.00	5.73	5.71	0.4	31.30	31.30	0.0	5.46	5.49	0.44
50.00	10.00	4.09	3.99	2.5	27.25	27.17	0.3	6.66	6.81	2.11
50.00	15.00	4.32	4.30	0.5	29.77	29.77	0.0	6.89	6.93	0.49
45.00	10.00	4.60	4.61	0.1	27.82	27.83	0.0	6.05	6.04	0.07
45.00	15.00	4.85	4.92	1.3	30.42	30.53	0.4	6.27	6.21	0.95
55.00	10.00	3.52	3.50	0.5	26.55	26.50	0.2	7.55	7.57	0.30
55.00	15.00	3.72	3.79	1.8	29.00	29.00	0.0	7.79	7.65	1.87
Sum				22.6			4.1			20.52
RMS_{COP}	$6.22e-02$									
$RMS_{Q_{cond}}$	$6.59e-02$									
$RMS_{W_{comp}}$	$8.49e-02$									

Meier/SIN-22TU/SIN-22TU-Qcond.pdf

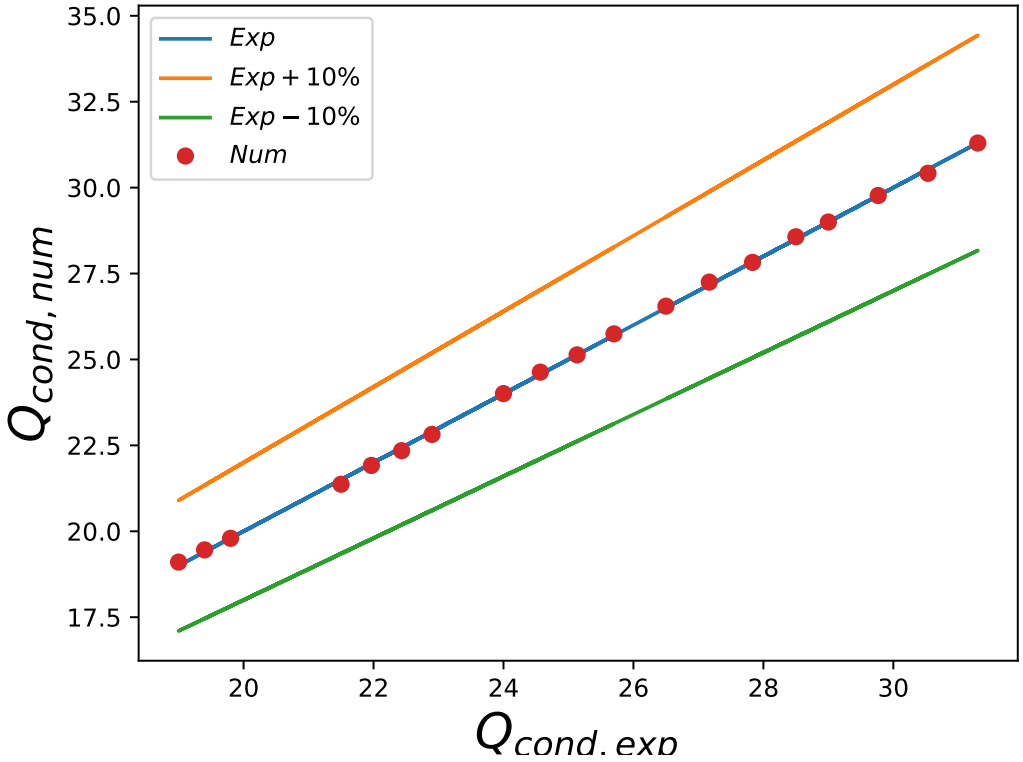

Figure 1: Q_{cond} differences between experiments and fitted data

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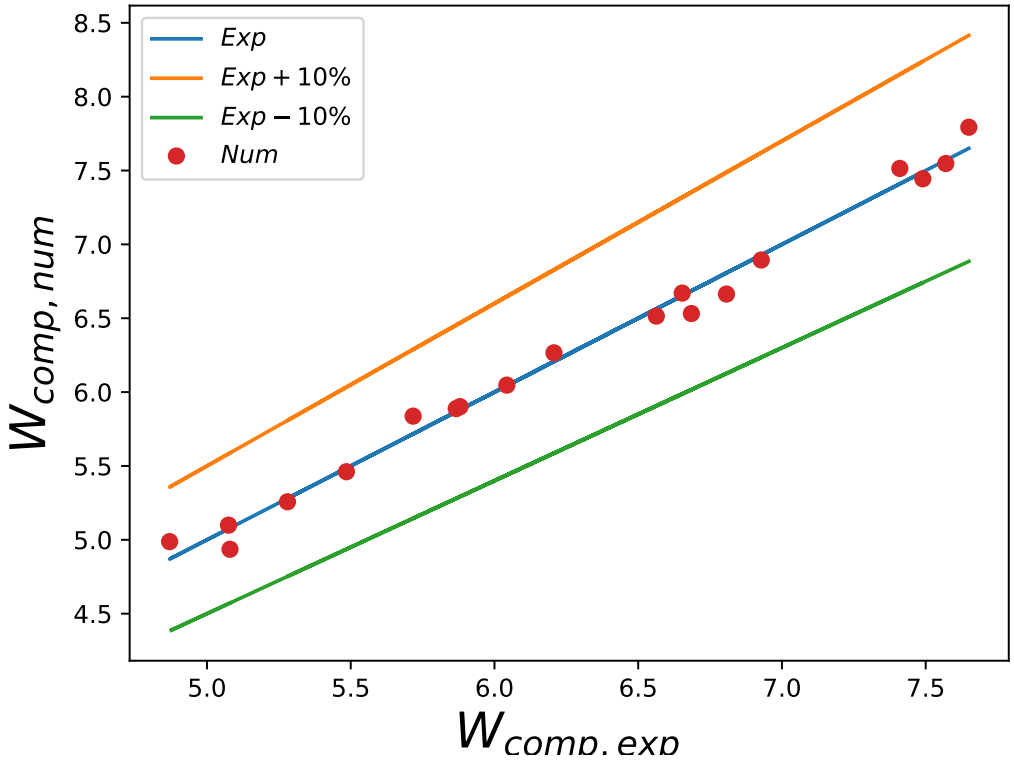

Figure 2: W_{comp} differences between experiments and fitted data

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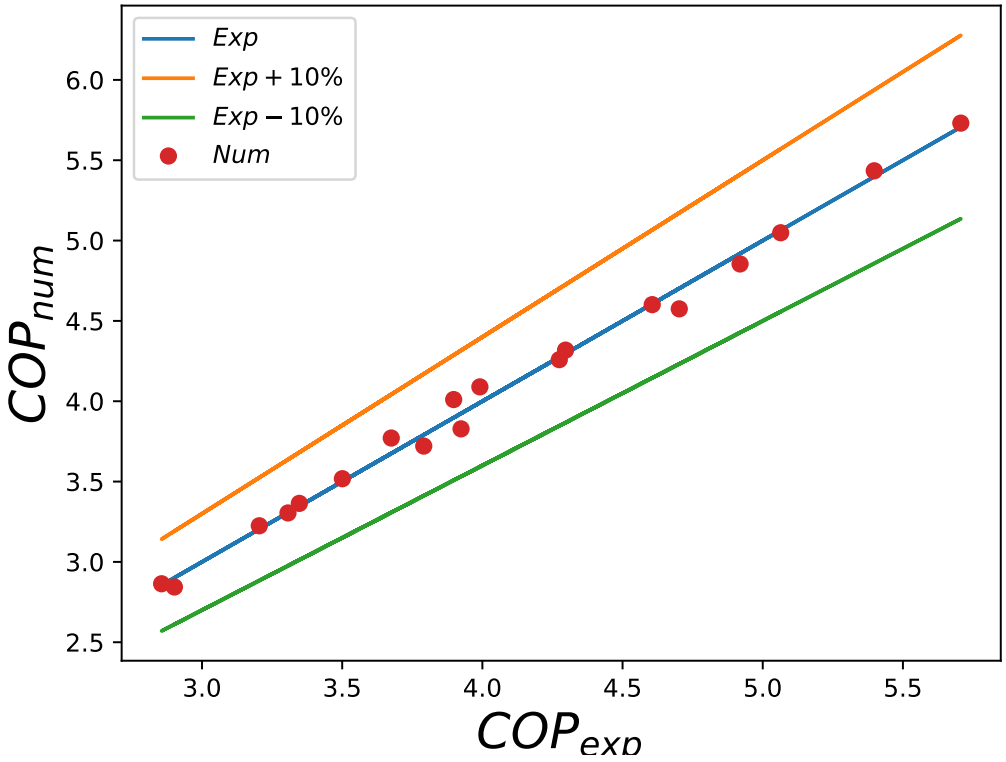

Figure 3: *COP* differences between experiments and fitted data