INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SI-108-HT

Parametric Heat Pump calculation

Dani Carbonell
dani.carbonell@spf.ch

2019/03/12 at: 16:07:24 h

Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	$[kW]$
P_{Q_1}	1^{st} *condenser polynomial coefficient*	1.1592e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	1.4291e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	-2.9978e+01
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-5.0425e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	5.0221e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	6.3589e+01
P_{COP_1}	1^{st} *COP polynomial coefficient*	1.0349e+01
P_{COP_2}	2^{st} *COP polynomial coefficient*	1.1188e+02
P_{COP_3}	3^{st} *COP polynomial coefficient*	-5.9716e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	-4.9672e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	5.0264e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	1.0878e+02
$\dot{m}_{cond}$	900.00 $[kg/h]$	
$\dot{m}_{evap}$	900.00 $[kg/h]$	
COP_{nom} (A0W35)	4.34	
$Q_{cond,nom}$ (A0W35)	8.21 $[kW]$	
$Q_{evap,nom}$ (A0W35)	6.32 $[kW]$	
$W_{comp,nom}$ (A0W35)	1.89 $[kW]$	
RMS_{COP}	$9.14e-02$	
$RMS_{Q_{cond}}$	$3.20e-02$	
$RMS_{W_{comp}}$	$6.94e-02$	
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	3.76	3.68	2.0	6.99	7.00	0.1	1.86	1.90	2.10
35.00	0.00	4.36	4.44	1.9	8.05	8.00	0.7	1.85	1.80	2.58
35.00	5.00	5.26	5.22	0.6	9.37	9.40	0.3	1.78	1.80	0.97
50.00	-5.00	2.96	2.96	0.1	7.15	7.10	0.7	2.41	2.40	0.62
50.00	0.00	3.12	2.89	8.1	7.80	7.80	0.1	2.50	2.70	7.46
50.00	5.00	3.59	3.62	1.1	8.73	8.70	0.4	2.44	2.40	1.48
45.00	-5.00	3.16	3.23	2.1	7.06	7.10	0.6	2.23	2.20	1.53
45.00	0.00	3.48	3.59	3.2	7.86	7.90	0.5	2.26	2.20	2.71
45.00	5.00	4.08	4.05	0.8	8.91	8.90	0.2	2.19	2.20	0.65
55.00	0.00	2.84	2.89	1.7	7.79	7.80	0.2	2.74	2.70	1.56
55.00	5.00	3.16	3.19	0.8	8.58	8.60	0.2	2.72	2.70	0.60
Sum				22.4			3.9			22.25
RMS_{COP}	$9.14e-02$									
$RMS_{Q_{cond}}$	$3.20e-02$									
$RMS_{W_{comp}}$	$6.94e-02$									

Meier/SI-108-HT/SI-108-HT-Qcond.pdf

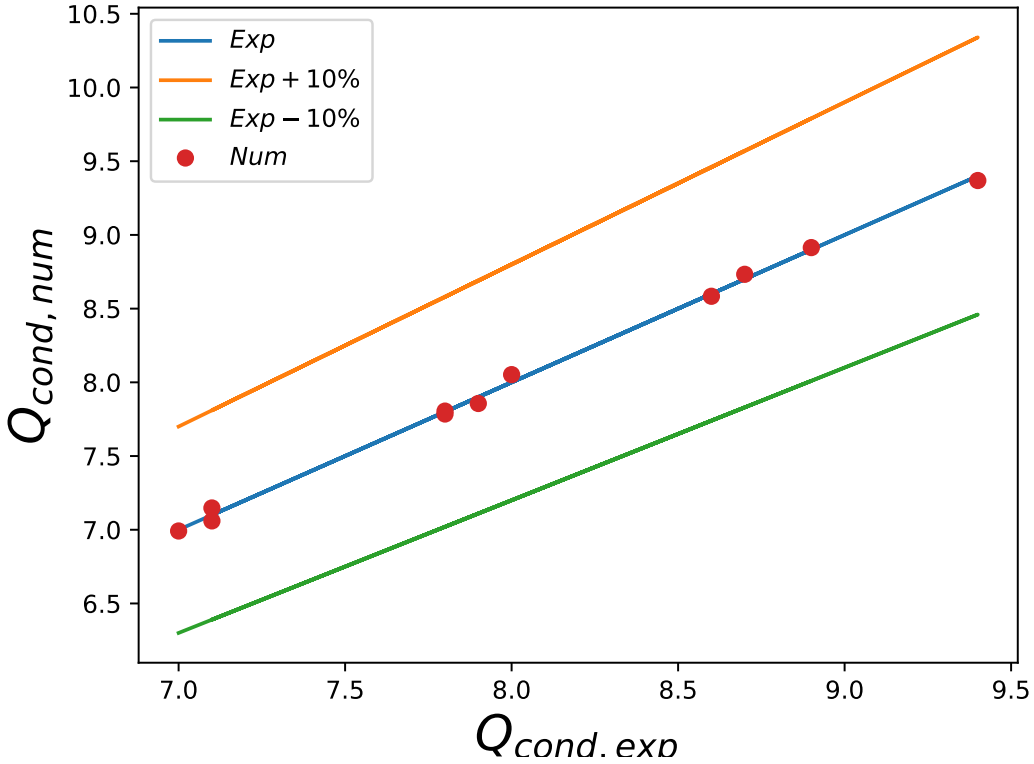

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SI-108-HT/SI-108-HT-Qcomp.pdf

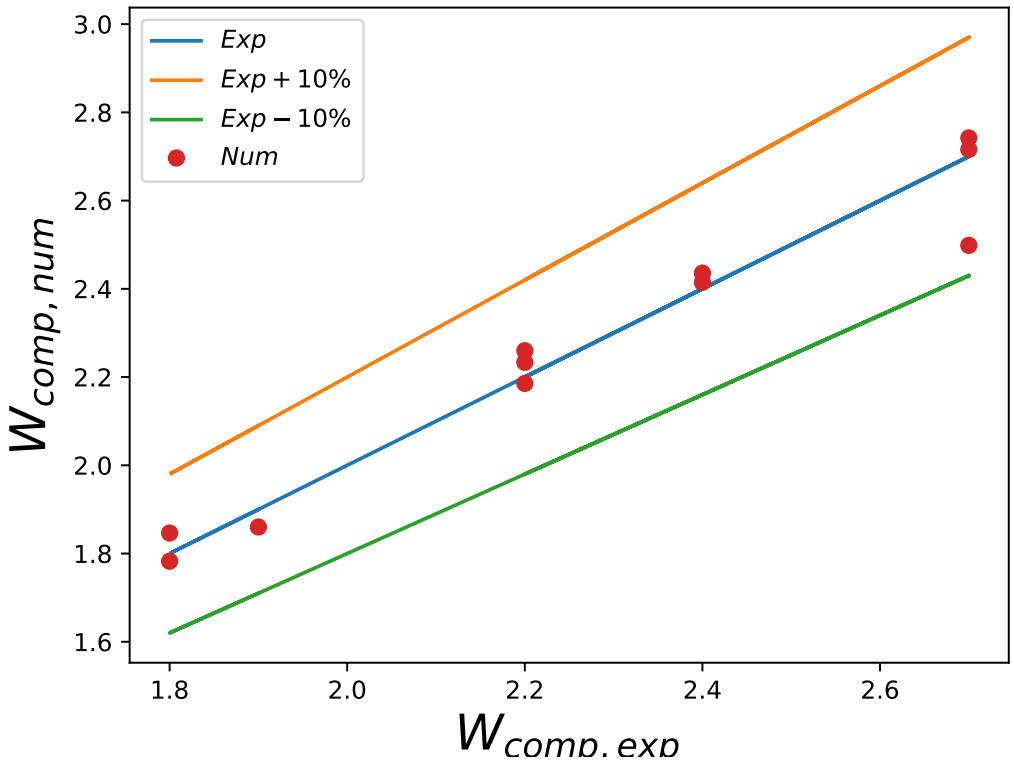

Figure 2: W_{comp} differences between experiments and fitted data

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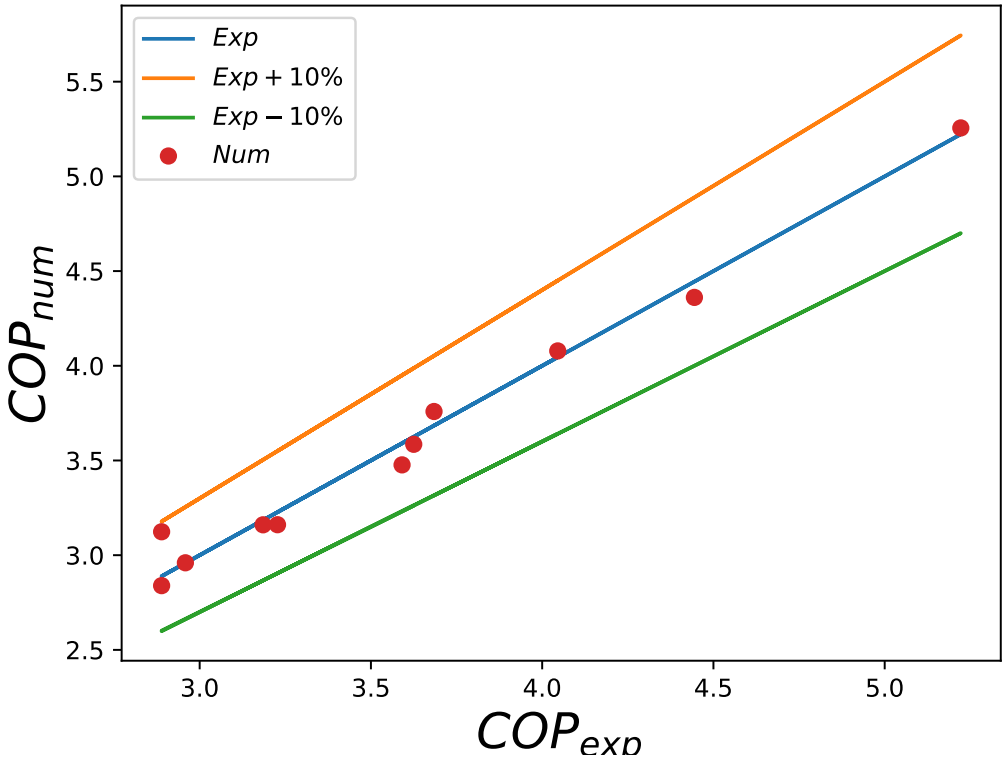

Figure 3: *COP* differences between experiments and fitted data