INSTITUT FÜR SOLARTECHNIK

HSR HOCHSCHULE FÜR TECHNIK RAPPERSWIL
FHO Fachhochschule Ostschweiz

Type977 fitting for heat pump SIN-100TE

Parametric Heat Pump calculation

Dani Carbonell
dani.carbonell@spf.ch

2019/03/12 at: 16:04:54 h

Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	
		$[kW]$
P_{Q_1}	1^{st} *condenser polynomial coefficient*	8.8992e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	6.8460e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	1.8677e+02
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-3.6498e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	5.8326e+01
P_{Q_6}	6^{st} *condenser polynomial coefficient*	-9.8419e+02
P_{COP_1}	1^{st} *COP polynomial coefficient*	5.4931e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	2.4336e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	2.6236e+00
P_{COP_4}	4^{st} *COP polynomial coefficient*	-1.0492e+01
P_{COP_5}	5^{st} *COP polynomial coefficient*	-7.4207e+00
P_{COP_6}	6^{st} *COP polynomial coefficient*	-8.8722e+01
$\dot{m}_{cond}$	16300.00 $[kg/h]$	
$\dot{m}_{evap}$	16300.00 $[kg/h]$	
COP_{nom} (A0W35)	4.34	
$Q_{cond,nom}$ (A0W35)	91.42 $[kW]$	
$Q_{evap,nom}$ (A0W35)	70.34 $[kW]$	
$W_{comp,nom}$ (A0W35)	21.08 $[kW]$	
RMS_{COP}	$3.95e-02$	
$RMS_{Q_{cond}}$	$1.30e-01$	
$RMS_{W_{comp}}$	$2.71e-01$	
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	3.95	3.90	1.3	81.40	81.50	0.1	20.61	20.90	1.40
35.00	0.00	4.37	4.40	0.7	92.43	92.30	0.1	21.15	20.98	0.82
35.00	5.00	4.79	4.81	0.5	103.50	103.45	0.1	21.63	21.51	0.54
50.00	-5.00	2.69	2.69	0.2	76.93	76.77	0.2	28.65	28.53	0.40
50.00	0.00	3.10	3.04	2.2	87.69	87.50	0.2	28.25	28.81	1.95
50.00	5.00	3.52	3.45	2.0	98.50	98.35	0.1	27.99	28.52	1.85
45.00	-5.00	3.17	3.20	1.1	79.00	79.13	0.2	24.95	24.72	0.95
45.00	0.00	3.59	3.61	0.7	89.86	89.90	0.0	25.06	24.90	0.67
45.00	5.00	4.00	4.03	0.8	100.77	100.90	0.1	25.18	25.02	0.67
55.00	0.00	2.57	2.60	1.2	84.98	85.10	0.1	33.10	32.73	1.12
55.00	5.00	2.98	2.99	0.4	95.67	95.80	0.1	32.10	32.02	0.23
35.00	10.00	5.20	5.20	0.0	114.61	114.60	0.0	22.05	22.04	0.04
35.00	15.00	5.61	5.57	0.6	125.77	125.75	0.0	22.44	22.57	0.60
50.00	10.00	3.93	3.86	1.7	109.35	109.20	0.1	27.83	28.28	1.58
50.00	15.00	4.34	4.30	0.9	120.26	120.05	0.2	27.74	27.93	0.70
45.00	10.00	4.41	4.45	0.9	111.72	111.90	0.2	25.32	25.13	0.73
45.00	15.00	4.82	4.87	1.0	122.71	122.90	0.2	25.46	25.25	0.82
55.00	10.00	3.39	3.40	0.3	106.42	106.50	0.1	31.40	31.32	0.25
55.00	15.00	3.79	3.83	0.9	117.22	117.20	0.0	30.89	30.61	0.91
Sum				17.4			2.3			16.22
RMS_{COP}	$3.95e-02$									
$RMS_{Q_{cond}}$	$1.30e-01$									
$RMS_{W_{comp}}$	$2.71e-01$									

Meier/SIN-100TE/SIN-100TE-Qcond.pdf

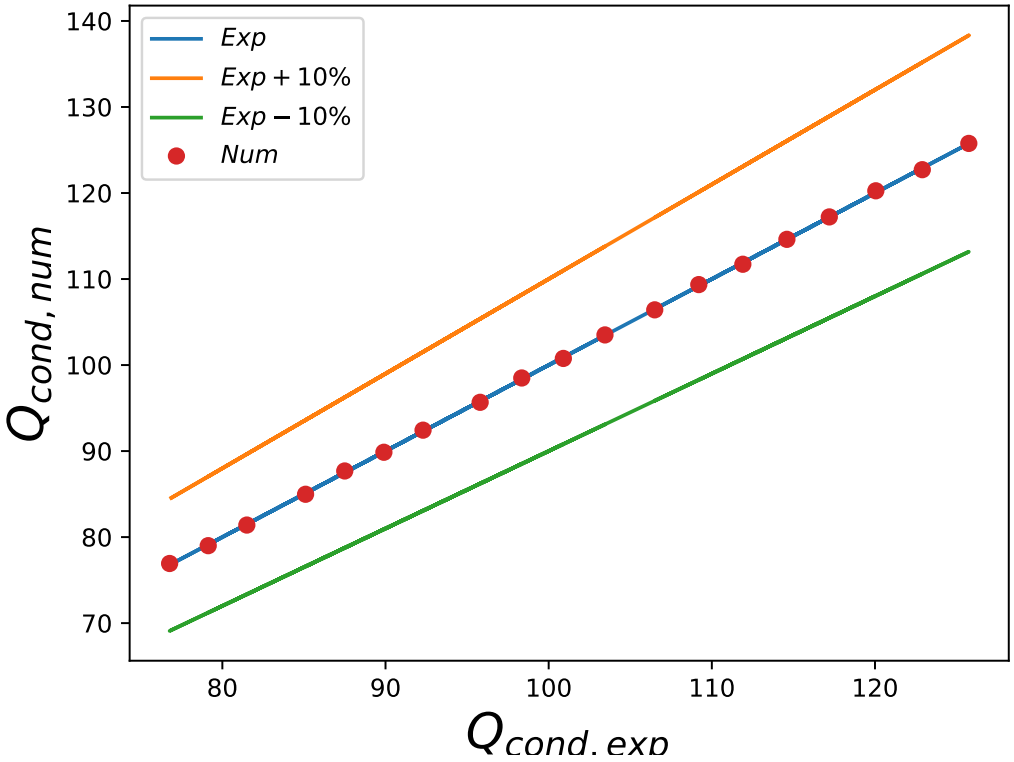

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SIN-100TE/SIN-100TE-Qcomp.pdf

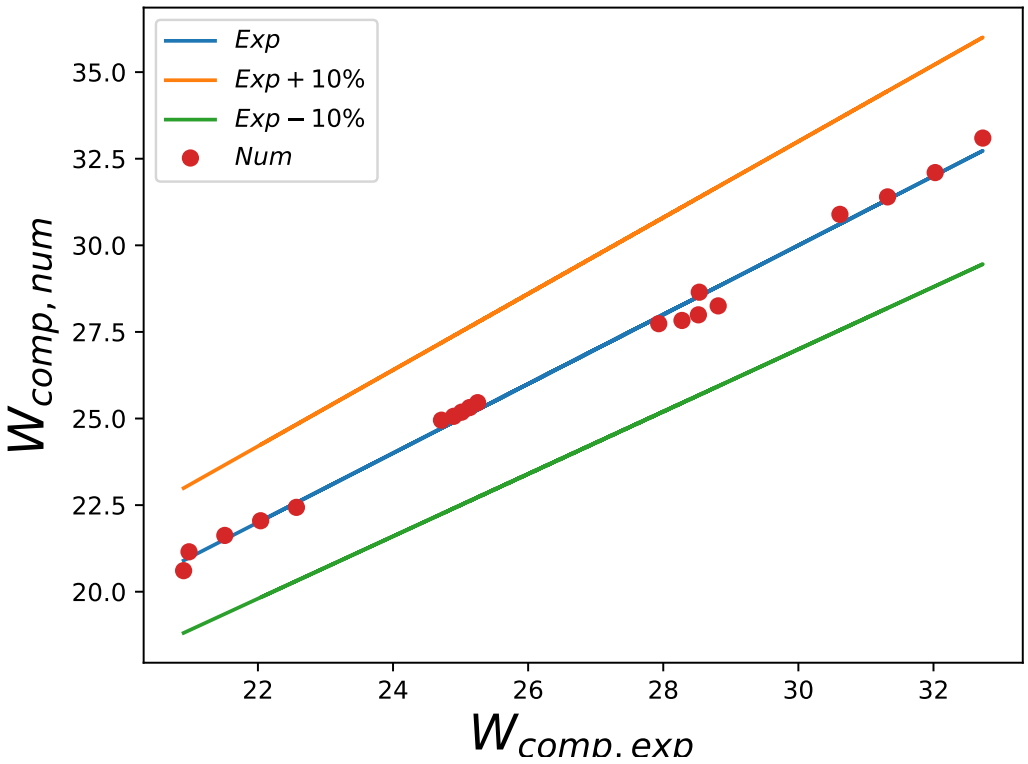

Figure 2: W_{comp} differences between experiments and fitted data

Meier/SIN-100TE/SIN-100TE-COP.pdf

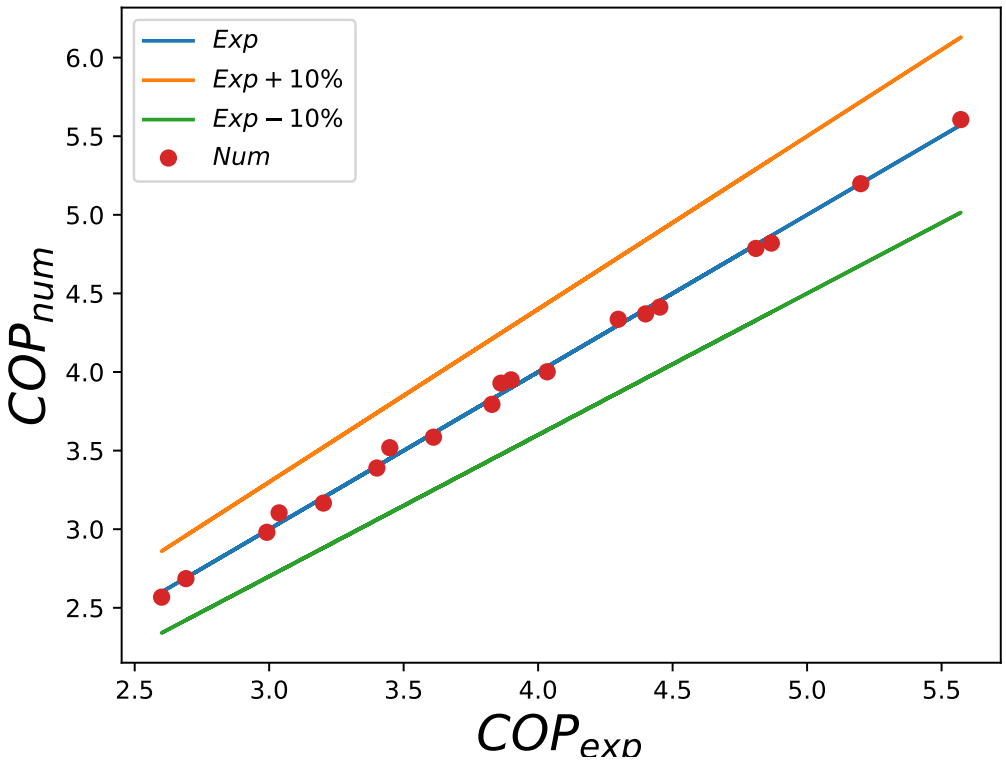

Figure 3: *COP* differences between experiments and fitted data