Type977 fitting for heat pump SIN-35TU

Parametric Heat Pump calculation

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2019/03/12 at: 16:04:47 h

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	
		$[kW]$
P_{Q_1}	1st condenser polynomial coefficient	3.5066e+01
P_{Q_2}	2st condenser polynomial coefficient	3.8459e+02
P_{Q_3}	3st condenser polynomial coefficient	6.5501e+01
P_{Q_4}	4st condenser polynomial coefficient	-6.2781e+02
P_{Q_5}	5st condenser polynomial coefficient	3.8715e+02
P_{Q_6}	6st condenser polynomial coefficient	-3.7043e+02
P_{COP_1}	1st COP polynomial coefficient	7.5227e+01
P_{COP_2}	2st COP polynomial coefficient	1.8270e+02
P_{COP_3}	3st COP polynomial coefficient	-9.8056e+02
P_{COP_4}	4st COP polynomial coefficient	-7.3151e+02
P_{COP_5}	5st COP polynomial coefficient	-2.9248e+03
P_{COP_6}	6st COP polynomial coefficient	3.3858e+03
$\dot{m}_{cond}$	6100.00 $[kg/h]$	
$\dot{m}_{evap}$	6100.00 $[kg/h]$	
COP_{nom} (A0W35)	5.37	
$Q_{cond,nom}$ (A0W35)	34.81 $[kW]$	
$Q_{evap,nom}$ (A0W35)	28.33 $[kW]$	
$W_{comp,nom}$ (A0W35)	6.48 $[kW]$	
RMS_{COP}	$5.90e + 00$	
$RMS_{Q_{cond}}$	$3.15e - 01$	
$RMS_{W_{comp}}$	$6.62e + 00$	
Fit model	Average Temperature	

Table 2: Differences between experiments and fitted data for the heat pump. $error = 100 \cdot \left| \frac{Q_{exp} - Q_{num}}{Q_{exp}} \right|$ 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	2.45	4.30	43.2	30.56	30.50	0.2	12.50	7.09	76.29
35.00	0.00	5.47	4.80	14.1	35.12	34.80	0.9	6.41	7.25	11.52
35.00	5.00	7.33	5.51	33.0	40.30	40.40	0.3	5.50	7.33	25.03
50.00	-5.00	4.34	2.93	48.0	28.65	28.83	0.6	6.60	9.83	32.87
50.00	0.00	6.61	3.46	91.2	33.05	33.00	0.2	5.00	9.55	47.61
50.00	5.00	7.22	3.90	85.3	37.84	38.10	0.7	5.24	9.78	46.41
45.00	-5.00	1.82	3.51	48.1	30.07	29.67	1.4	16.53	8.46	95.38
45.00	0.00	4.01	4.04	0.6	34.20	33.90	0.9	8.53	8.40	1.55
45.00	5.00	4.95	4.59	8.0	39.10	39.25	0.4	7.89	8.56	7.74
55.00	0.00	11.56	3.00	285.2	31.77	32.10	1.0	2.75	10.70	74.30
55.00	5.00	11.82	33.59	64.8	36.39	36.95	1.5	3.08	1.10	179.90
35.00	10.00	7.59	6.20	22.5	45.82	46.00	0.4	6.03	7.42	18.67
35.00	15.00	6.16	6.88	10.5	51.73	51.60	0.3	8.40	7.50	11.99
50.00	10.00	6.17	4.32	43.0	42.96	43.20	0.5	6.96	10.01	30.44
50.00	15.00	3.07	4.72	35.0	48.90	48.30	1.2	15.94	10.23	55.72
45.00	10.00	4.25	5.12	17.0	44.47	44.60	0.3	10.47	8.71	20.18
45.00	15.00	1.63	5.63	71.1	50.37	49.95	0.8	30.92	8.87	248.57
55.00	10.00	10.43	3.70	181.9	41.27	41.80	1.3	3.96	11.30	64.98
55.00	15.00	7.31	4.02	81.8	46.50	46.65	0.3	6.36	11.60	45.16
Sum				1184.2			13.2			1094.32
RMS_{COP}	$5.90e+00$									
$RMS_{Q_{cond}}$	$3.15e-01$									
$RMS_{W_{comp}}$	$6.62e+00$									

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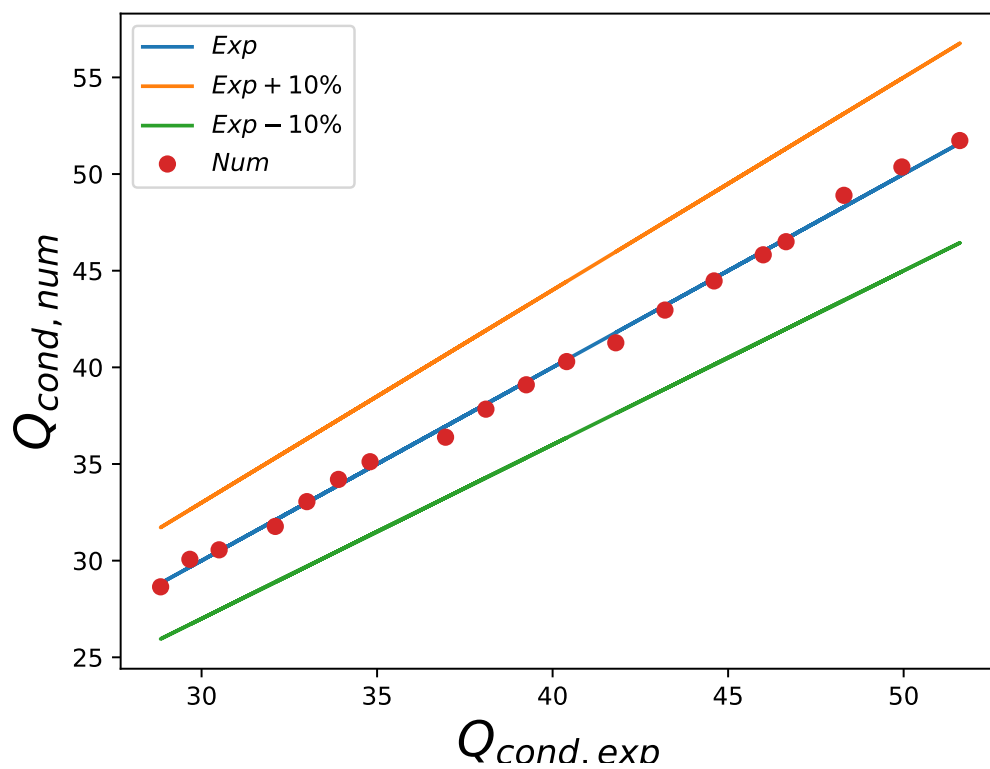
Figure 1: Q_{cond} differences between experiments and fitted data

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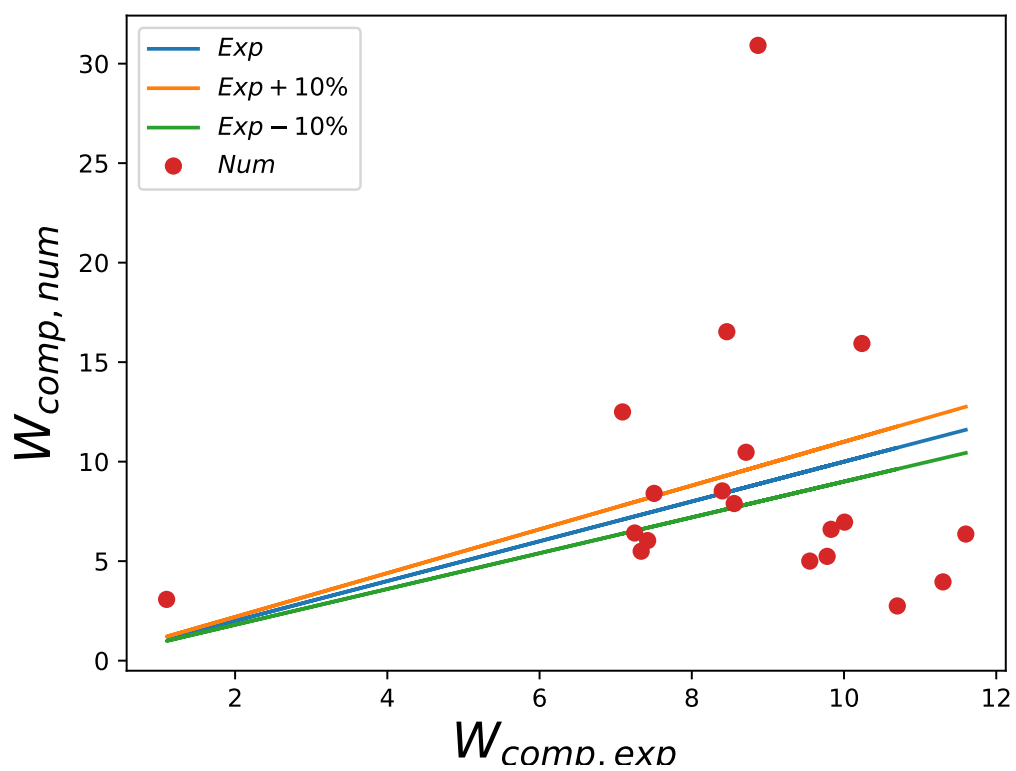
Figure 2: W_{comp} differences between experiments and fitted data

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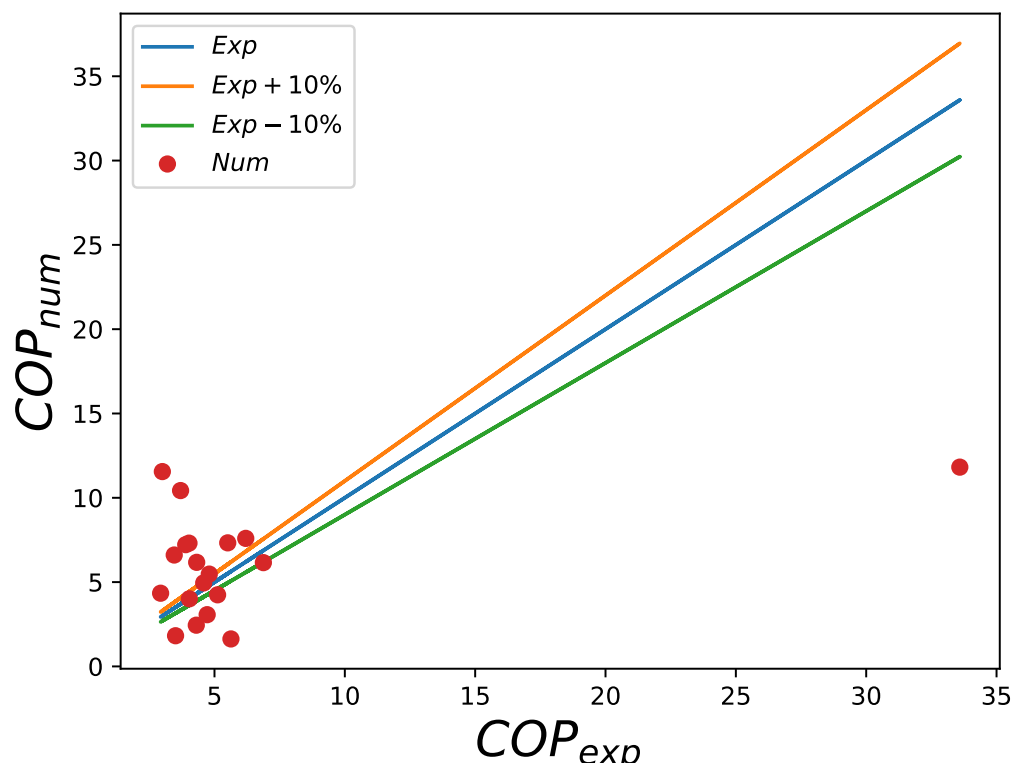RAPPERSWIL

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Figure 3: COP differences between experiments and fitted data