INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINK-11TES

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*	6.1536e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	3.1212e+01
P_{Q_3}	3^{st} *condenser polynomial coefficient*	-6.9283e+02
P_{Q_4}	4^{st} *condenser polynomial coefficient*	3.5782e+02
P_{Q_5}	5^{st} *condenser polynomial coefficient*	2.1628e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	2.2393e+03
P_{COP_1}	1^{st} *COP polynomial coefficient*	4.1121e+01
P_{COP_2}	2^{st} *COP polynomial coefficient*	3.6760e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-4.8336e+02
P_{COP_4}	4^{st} *COP polynomial coefficient*	-4.3409e+01
P_{COP_5}	5^{st} *COP polynomial coefficient*	1.0785e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	1.4993e+03
$\dot{m}_{cond}$	1300.00 $[kg/h]$	
$\dot{m}_{evap}$	1300.00 $[kg/h]$	
COP_{nom} (A0W35)	4.56	
$Q_{cond,nom}$ (A0W35)	10.15 $[kW]$	
$Q_{evap,nom}$ (A0W35)	7.92 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.23 $[kW]$	
RMS_{COP}	$2.57e-02$	
$RMS_{Q_{cond}}$	$3.18e-02$	
$RMS_{W_{comp}}$	$1.71e-02$	
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	4.31	4.31	0.2	9.29	9.30	0.1	2.15	2.16	0.27
35.00	0.00	4.97	5.00	0.6	10.63	10.60	0.2	2.14	2.12	0.81
35.00	5.00	5.74	5.71	0.5	12.11	12.10	0.1	2.11	2.12	0.39
55.00	0.00	3.12	3.10	0.6	9.80	9.80	0.0	3.14	3.16	0.64
55.00	5.00	3.45	3.50	1.4	11.17	11.20	0.2	3.24	3.20	1.16
35.00	10.00	6.61	6.60	0.1	13.75	13.80	0.4	2.08	2.09	0.45
35.00	15.00	7.50	7.51	0.1	15.43	15.40	0.2	2.06	2.05	0.31
55.00	10.00	3.86	3.82	1.0	12.66	12.60	0.4	3.28	3.30	0.53
55.00	15.00	4.29	4.30	0.2	14.17	14.20	0.2	3.30	3.30	0.01
Sum				4.6			1.9			4.57
RMS_{COP}	$2.57e-02$									
$RMS_{Q_{cond}}$	$3.18e-02$									
$RMS_{W_{comp}}$	$1.71e-02$									

Meier/SINK-11TES/SINK-11TES-Qcond.pdf

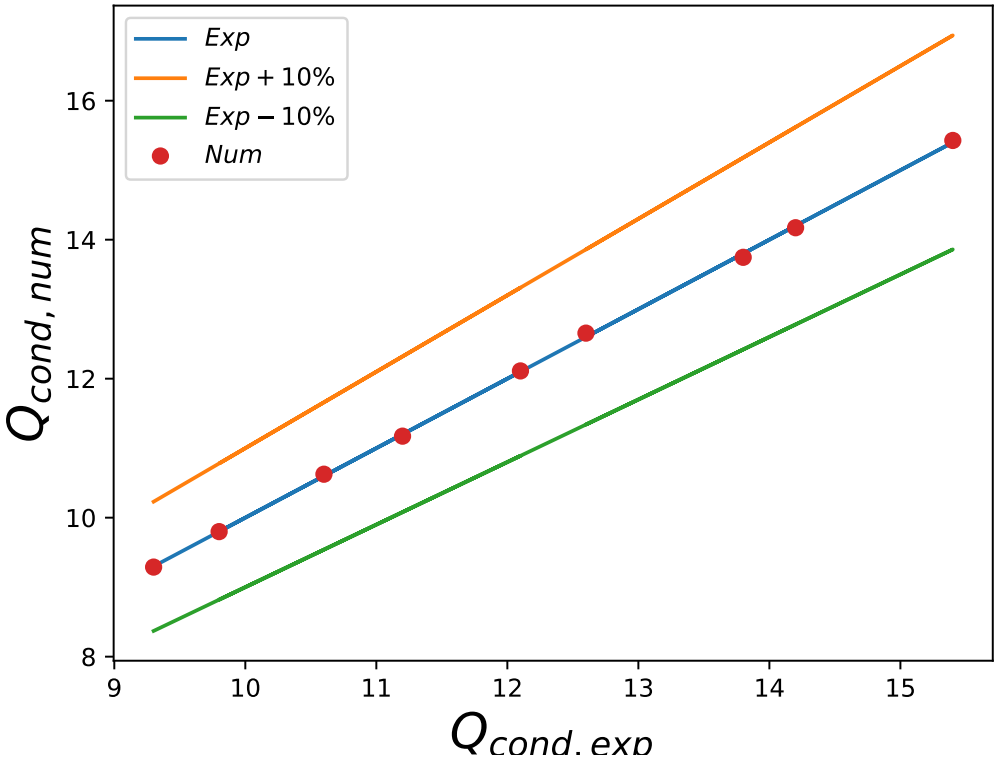

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINK-11TES/SINK-11TES-Qcomp.pdf

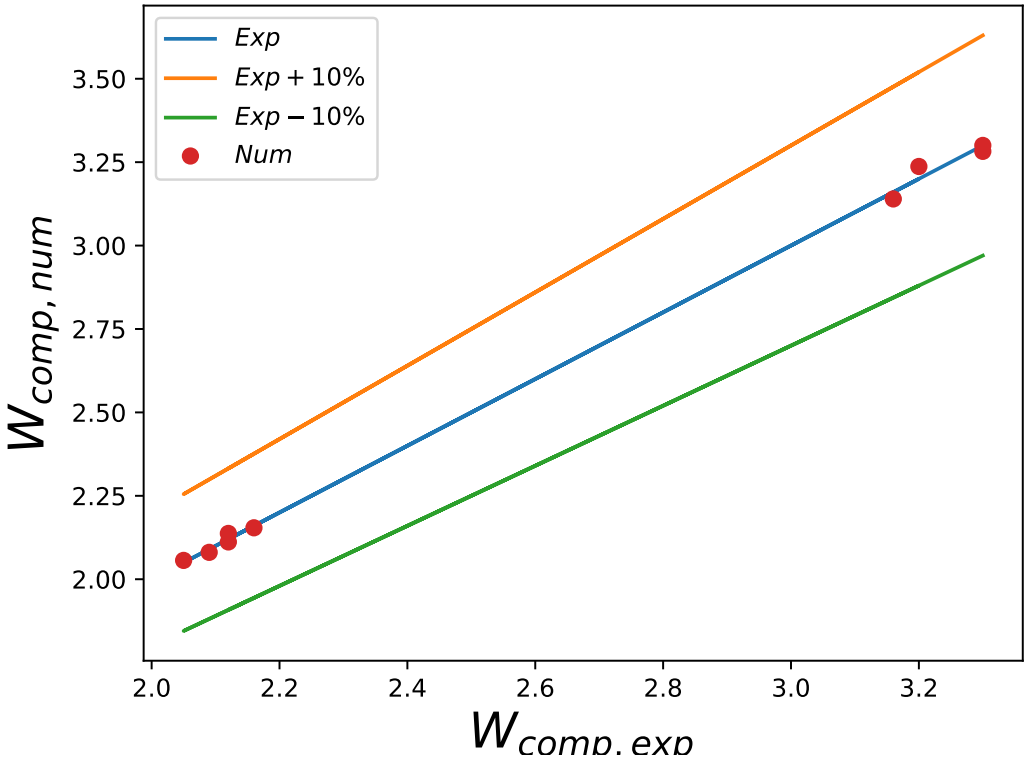

Figure 2: W_{comp} differences between experiments and fitted data

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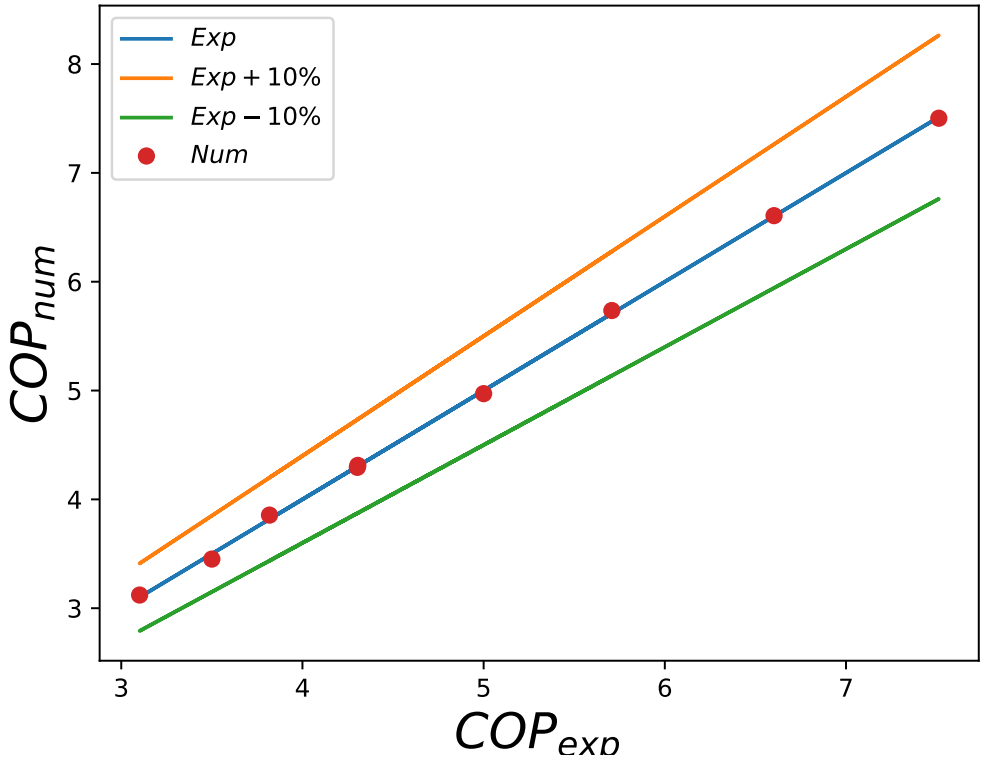

Figure 3: *COP* differences between experiments and fitted data