INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SI-242

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*	8.6790e+01
P_{Q_2}	2^{st} *condenser polynomial coefficient*	9.3917e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	-4.6678e+02
P_{Q_4}	4^{st} *condenser polynomial coefficient*	-4.4486e+03
P_{Q_5}	5^{st} *condenser polynomial coefficient*	3.3440e+03
P_{Q_6}	6^{st} *condenser polynomial coefficient*	1.2445e+03
P_{COP_1}	1^{st} *COP polynomial coefficient*	2.3058e+00
P_{COP_2}	2^{st} *COP polynomial coefficient*	1.3236e+02
P_{COP_3}	3^{st} *COP polynomial coefficient*	5.9440e+01
P_{COP_4}	4^{st} *COP polynomial coefficient*	-6.7673e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	2.7135e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	-3.2856e+02
$\dot{m}_{cond}$	5400.00 $[kg/h]$	
$\dot{m}_{evap}$	5400.00 $[kg/h]$	
COP_{nom} (A0W35)	4.27	
$Q_{cond,nom}$ (A0W35)	45.40 $[kW]$	
$Q_{evap,nom}$ (A0W35)	34.78 $[kW]$	
$W_{comp,nom}$ (A0W35)	10.62 $[kW]$	
RMS_{COP}	$7.57e-02$	
$RMS_{Q_{cond}}$	$7.00e-01$	
$RMS_{W_{comp}}$	$1.51e-01$	
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	3.50	3.56	1.6	40.27	40.60	0.8	11.49	11.40	0.81
35.00	0.00	4.22	4.07	3.6	45.17	44.00	2.7	10.70	10.80	0.93
35.00	5.00	5.11	5.20	1.6	52.25	53.00	1.4	10.21	10.20	0.14
50.00	-5.00	2.59	2.51	3.2	41.03	40.20	2.1	15.83	16.00	1.07
50.00	0.00	2.76	2.86	3.3	42.08	42.60	1.2	15.23	14.90	2.19
50.00	5.00	3.10	3.07	0.9	45.22	45.40	0.4	14.61	14.80	1.28
45.00	-5.00	3.13	3.16	0.8	39.96	40.40	1.1	12.76	12.80	0.32
45.00	0.00	3.49	3.52	1.0	42.36	43.00	1.5	12.14	12.20	0.47
45.00	5.00	3.99	3.95	1.0	46.68	45.80	1.9	11.70	11.60	0.88
Sum				17.0			13.1			8.10
RMS_{COP}	$7.57e-02$									
$RMS_{Q_{cond}}$	$7.00e-01$									
$RMS_{W_{comp}}$	$1.51e-01$									

Meier/SI-242/SI-242-Qcond.pdf

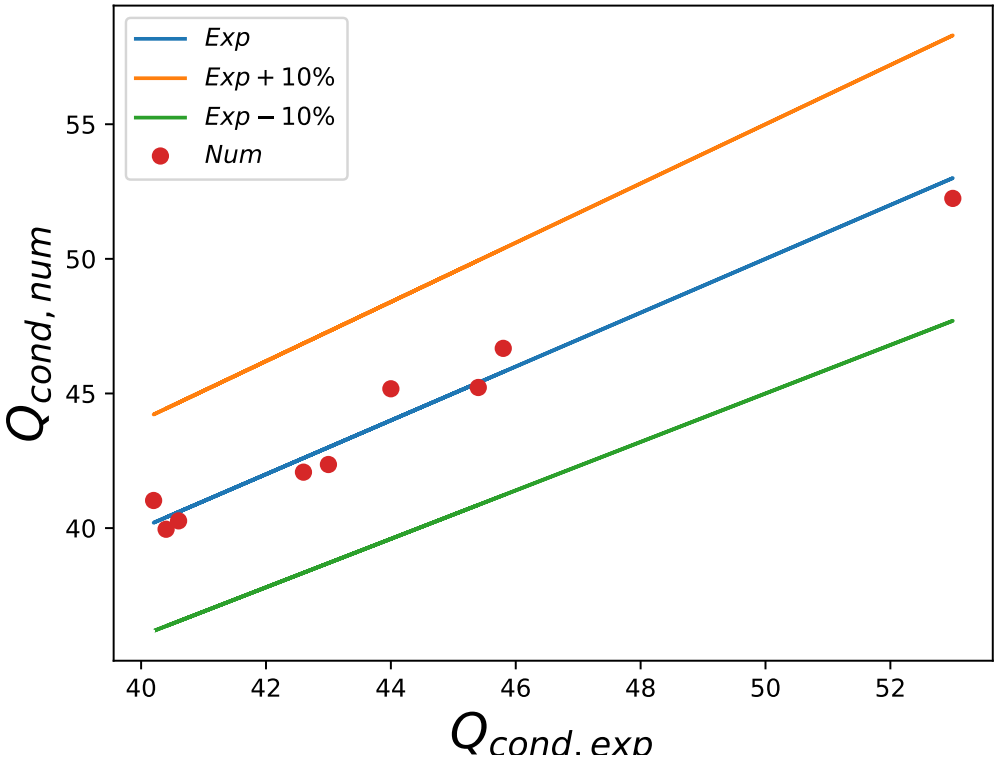

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SI-242/SI-242-Qcomp.pdf

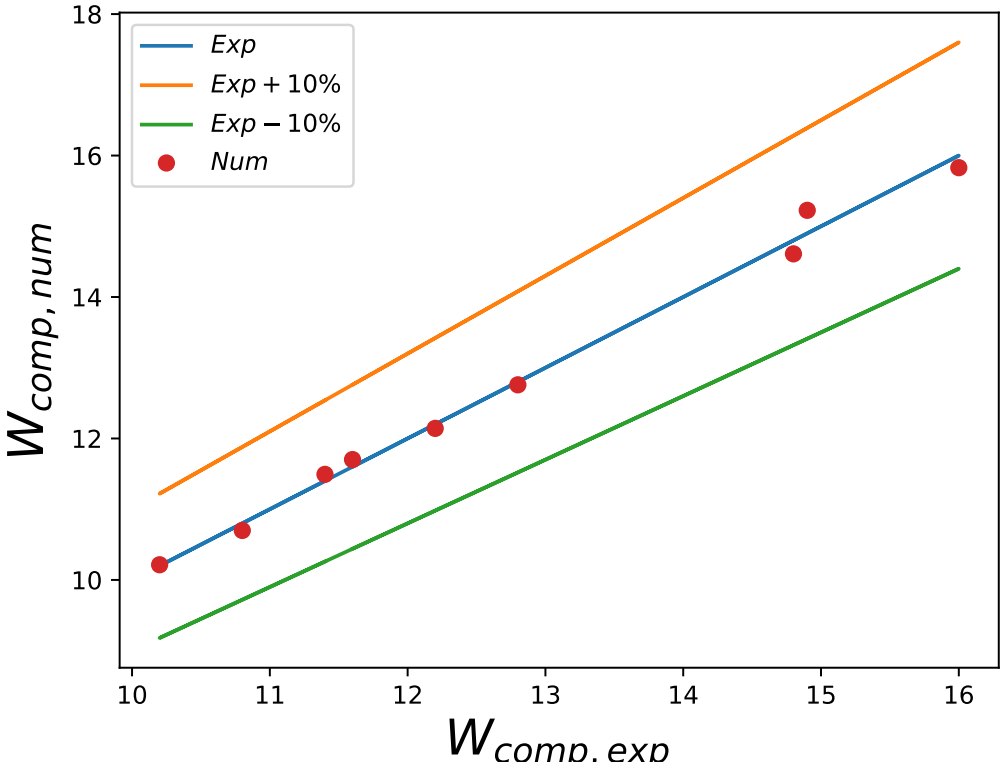

Figure 2: W_{comp} differences between experiments and fitted data

Meier/SI-242/SI-242-COP.pdf

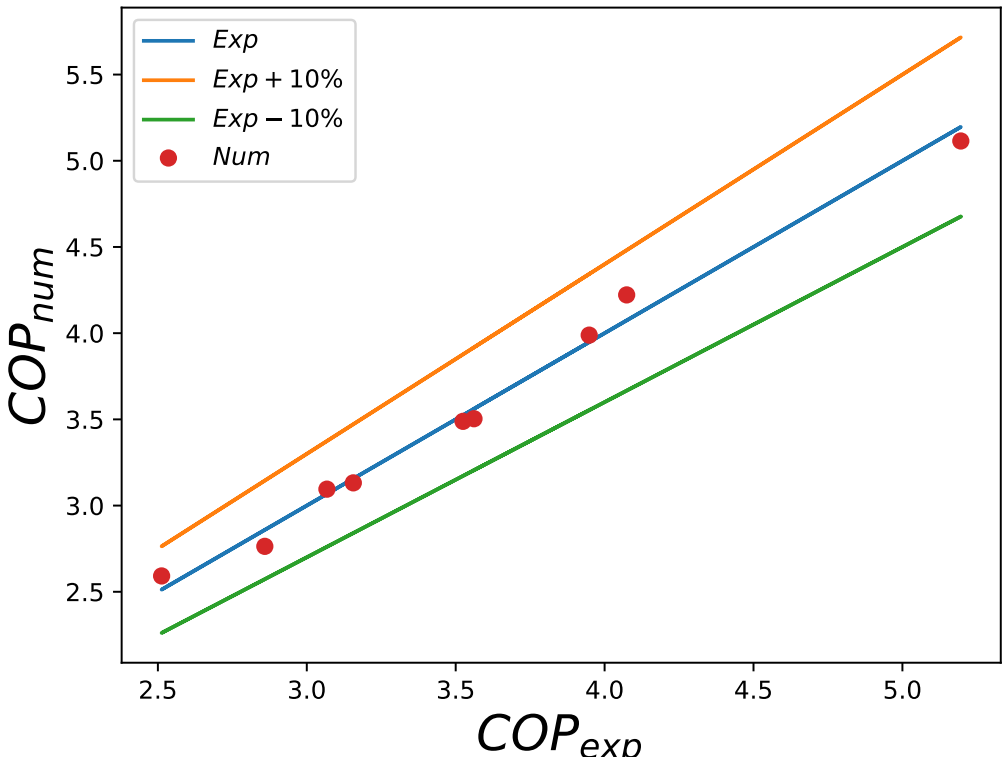

Figure 3: *COP* differences between experiments and fitted data