INSTITUT FÜR SOLARTECHNIK

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Type977 fitting for heat pump SINK-14TES

Parametric Heat Pump calculation

Dani Carbonell
dani.carbonell@spf.ch

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	$[kW]$
P_{Q_1}	1^{st} *condenser polynomial coefficient*	2.2000e+02
P_{Q_2}	2^{st} *condenser polynomial coefficient*	-2.0513e+02
P_{Q_3}	3^{st} *condenser polynomial coefficient*	-2.8863e+03
P_{Q_4}	4^{st} *condenser polynomial coefficient*	2.0874e+03
P_{Q_5}	5^{st} *condenser polynomial coefficient*	3.2343e+02
P_{Q_6}	6^{st} *condenser polynomial coefficient*	9.4939e+03
P_{COP_1}	1^{st} *COP polynomial coefficient*	9.1287e+01
P_{COP_2}	2^{st} *COP polynomial coefficient*	-5.8357e+01
P_{COP_3}	3^{st} *COP polynomial coefficient*	-1.1986e+03
P_{COP_4}	4^{st} *COP polynomial coefficient*	5.8280e+02
P_{COP_5}	5^{st} *COP polynomial coefficient*	1.7233e+02
P_{COP_6}	6^{st} *COP polynomial coefficient*	3.8806e+03
$\dot{m}_{cond}$	1600.00 $[kg/h]$	
$\dot{m}_{evap}$	1600.00 $[kg/h]$	
COP_{nom} (A0W35)	3.52	
$Q_{cond,nom}$ (A0W35)	10.62 $[kW]$	
$Q_{evap,nom}$ (A0W35)	7.61 $[kW]$	
$W_{comp,nom}$ (A0W35)	3.01 $[kW]$	
RMS_{COP}	$5.36e-02$	
$RMS_{Q_{cond}}$	$7.58e-02$	
$RMS_{W_{comp}}$	$2.94e-02$	
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	4.15	4.11	1.0	11.70	11.70	0.0	2.82	2.85	0.99
35.00	0.00	4.61	4.71	2.1	13.10	13.10	0.0	2.84	2.78	2.16
35.00	5.00	5.25	5.21	0.8	14.82	14.80	0.1	2.82	2.84	0.64
55.00	0.00	3.03	3.00	0.9	12.25	12.20	0.4	4.04	4.06	0.49
55.00	5.00	3.34	3.41	1.9	13.95	14.10	1.1	4.18	4.14	0.86
35.00	10.00	6.17	6.11	1.0	17.08	17.10	0.1	2.77	2.80	1.08
35.00	15.00	7.15	7.19	0.5	19.41	19.40	0.0	2.72	2.70	0.58
55.00	10.00	3.85	3.80	1.3	16.05	15.90	0.9	4.16	4.18	0.36
55.00	15.00	4.29	4.30	0.3	17.85	17.90	0.3	4.16	4.16	0.00
Sum				9.8			3.0			7.17
RMS_{COP}	$5.36e-02$									
$RMS_{Q_{cond}}$	$7.58e-02$									
$RMS_{W_{comp}}$	$2.94e-02$									

Meier/SINK-14TES/SINK-14TES-Qcond.pdf

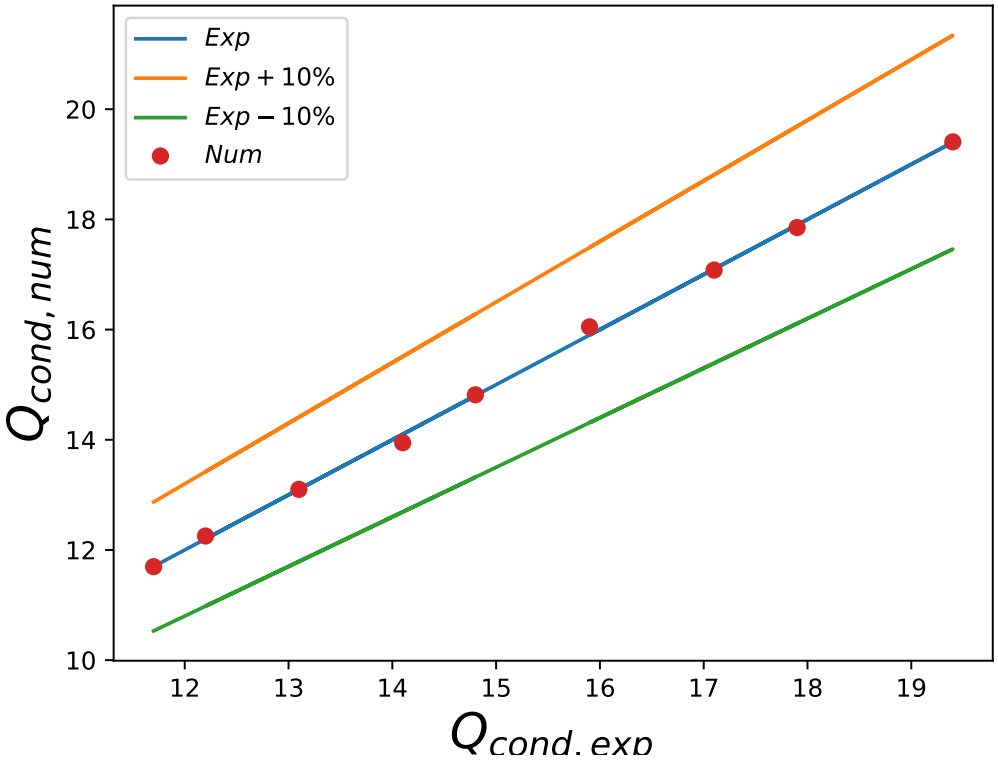

Figure 1: Q_{cond} differences between experiments and fitted data

Meier/SINK-14TES/SINK-14TES-Qcomp.pdf

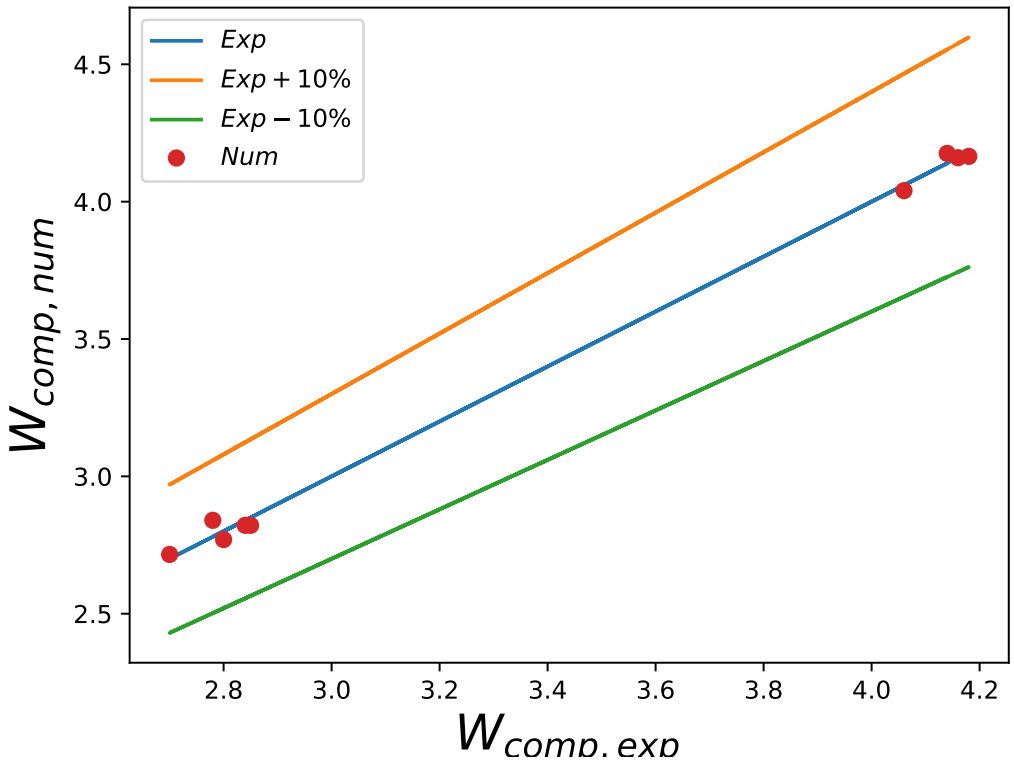

Figure 2: W_{comp} differences between experiments and fitted data

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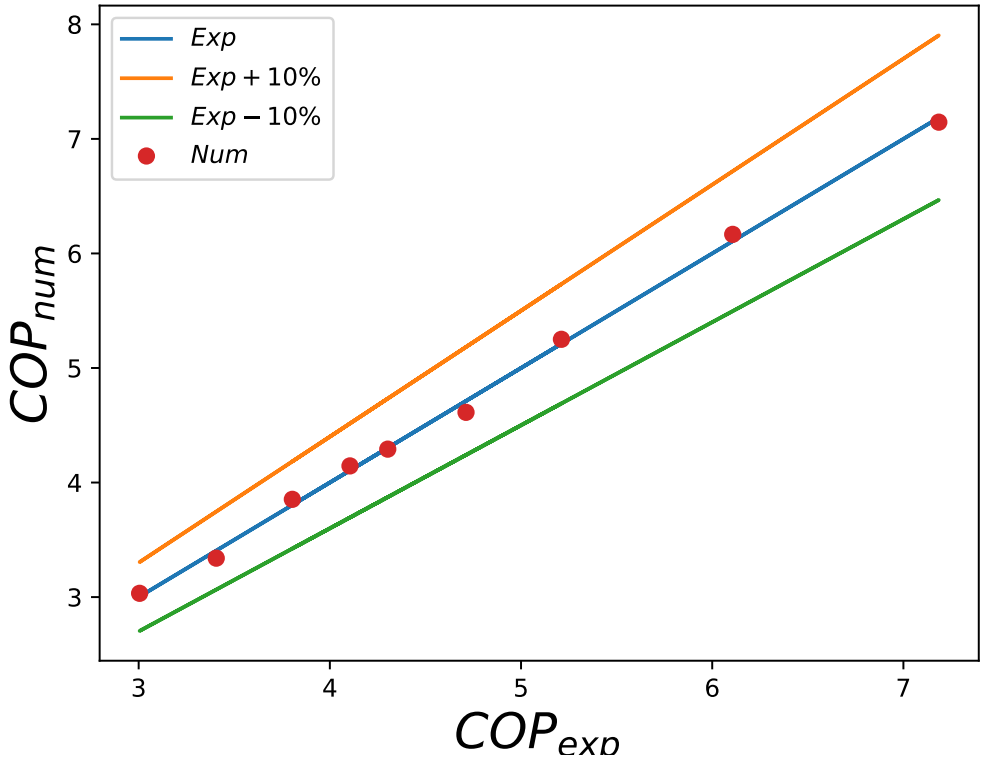

Figure 3: *COP* differences between experiments and fitted data