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Type977 fitting for heat pump AHCN9a

Parametric Heat Pump calculation

martin.neugebauer
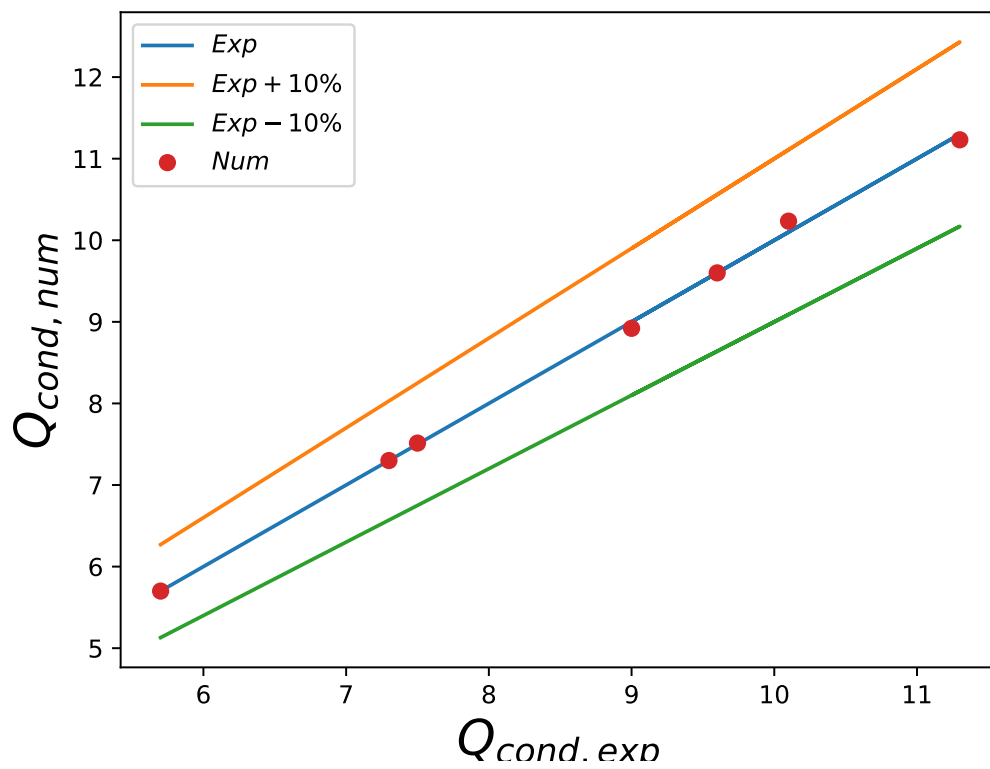
martin.neugebauer

2022/11/11 at: 13:12:29 h

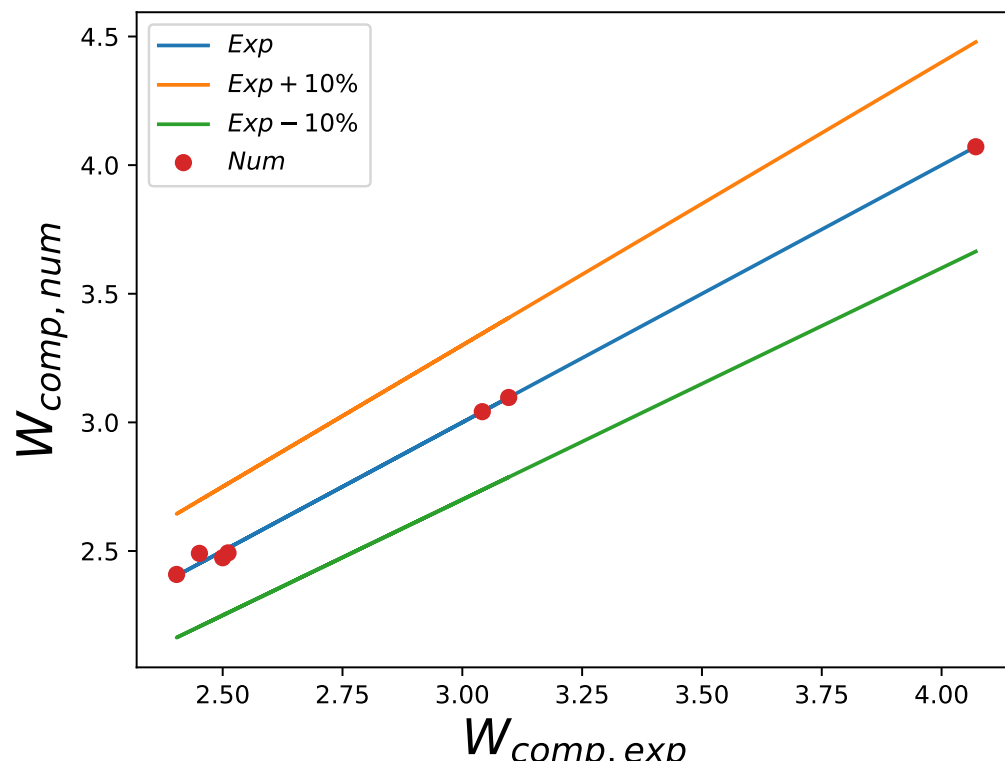Figure 1: Q_{cond} differences between experiments and fitted data

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

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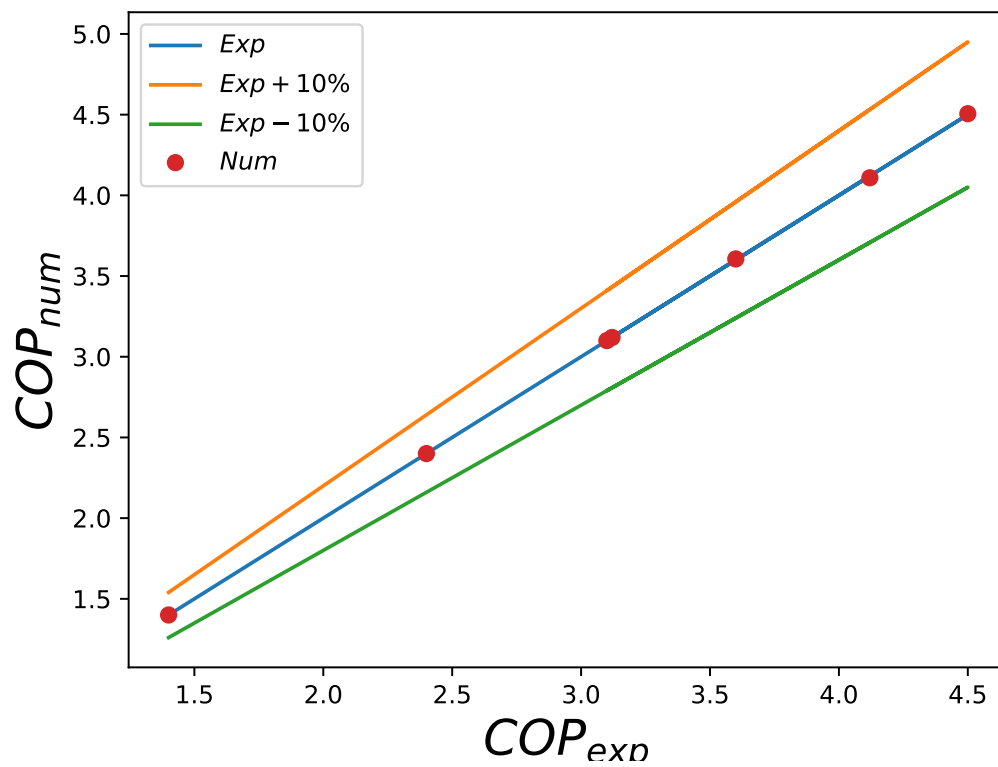
Figure 3: COP differences between experiments and fitted data

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	[kW]
P_{Q_1}	1st condenser polynomial coefficient	4.2965e+00
P_{Q_2}	2nd condenser polynomial coefficient	8.1714e+01
P_{Q_3}	3rd condenser polynomial coefficient	7.3032e+01
P_{Q_4}	4th condenser polynomial coefficient	-1.5241e+02
P_{Q_5}	5th condenser polynomial coefficient	5.8321e+02
P_{Q_6}	6th condenser polynomial coefficient	-2.8063e+02
P_{COP_1}	1st COP polynomial coefficient	3.3770e+00
P_{COP_2}	2nd COP polynomial coefficient	3.6420e+01
P_{COP_3}	3rd COP polynomial coefficient	1.5154e+01
P_{COP_4}	4th COP polynomial coefficient	-1.0466e+02
P_{COP_5}	5th COP polynomial coefficient	2.5745e+02
P_{COP_6}	6th COP polynomial coefficient	-1.0880e+02
$\dot{m}_{cond}$	981.35 $[kg/h]$	
$\dot{m}_{evap}$	1196.50 $[kg/h]$	
COP_{nom} (A0W35)	3.44	
$Q_{cond,nom}$ (A0W35)	8.48 $[kW]$	
$Q_{evap,nom}$ (A0W35)	6.02 $[kW]$	
$W_{comp,nom}$ (A0W35)	2.46 $[kW]$	
RMS_{COP}	$5.27e-03$	
$RMS_{Q_{cond}}$	$6.47e-02$	
$RMS_{W_{comp}}$	$1.93e-02$	
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.

$T_{cond,avg}$ ^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	7.00	4.11	4.12	0.3	10.23	10.10	1.3	2.49	2.45	1.60
50.00	7.00	3.10	3.10	0.0	9.60	9.60	0.0	3.10	3.10	0.00
35.00	2.00	3.61	3.60	0.2	8.92	9.00	0.9	2.47	2.50	1.05
35.00	10.00	4.51	4.50	0.1	11.23	11.30	0.6	2.49	2.51	0.74
35.00	-7.00	3.12	3.12	0.0	7.51	7.50	0.2	2.41	2.40	0.21
50.00	-7.00	2.40	2.40	0.0	7.30	7.30	0.0	3.04	3.04	0.00
65.00	-15.00	1.40	1.40	0.0	5.70	5.70	0.0	4.07	4.07	0.00
Sum				0.6			3.0			3.60
RMS_{COP}	$5.27e-03$									
$RMS_{Q_{cond}}$	$6.47e-02$									
$RMS_{W_{comp}}$	$1.93e-02$									