Type977 fitting for heat pump SINK-6TES

Parametric Heat Pump calculation

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	
		$[kW]$
P_{Q_1}	1st condenser polynomial coefficient	8.3751e+01
P_{Q_2}	2st condenser polynomial coefficient	-7.1522e+01
P_{Q_3}	3st condenser polynomial coefficient	-1.0842e+03
P_{Q_4}	4st condenser polynomial coefficient	7.9965e+02
P_{Q_5}	5st condenser polynomial coefficient	1.0799e+02
P_{Q_6}	6st condenser polynomial coefficient	3.5558e+03
P_{COP_1}	1st COP polynomial coefficient	1.0381e+02
P_{COP_2}	2st COP polynomial coefficient	-8.8267e+01
P_{COP_3}	3st COP polynomial coefficient	-1.3750e+03
P_{COP_4}	4st COP polynomial coefficient	7.7882e+02
P_{COP_5}	5st COP polynomial coefficient	6.2670e+01
P_{COP_6}	6st COP polynomial coefficient	4.4579e+03
$\dot{m}_{cond}$	700.00 $[kg/h]$	
$\dot{m}_{evap}$	700.00 $[kg/h]$	
COP_{nom} (A0W35)	3.28	
$Q_{cond,nom}$ (A0W35)	4.88 $[kW]$	
$Q_{evap,nom}$ (A0W35)	3.39 $[kW]$	
$W_{comp,nom}$ (A0W35)	1.49 $[kW]$	
RMS_{COP}	$3.49e-02$	
$RMS_{Q_{cond}}$	$4.22e-02$	
$RMS_{W_{comp}}$	$7.20e-03$	
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	4.13	4.13	0.0	5.19	5.20	0.1	1.26	1.26	0.15
35.00	0.00	4.68	4.68	0.1	5.90	5.90	0.0	1.26	1.26	0.18
35.00	5.00	5.32	5.32	0.1	6.71	6.70	0.1	1.26	1.26	0.05
55.00	0.00	2.82	2.82	0.0	5.30	5.30	0.0	1.88	1.88	0.02
55.00	5.00	3.26	3.21	1.4	6.15	6.10	0.9	1.89	1.90	0.51
35.00	10.00	6.08	6.08	0.1	7.60	7.60	0.0	1.25	1.25	0.09
35.00	15.00	6.94	6.94	0.0	8.59	8.60	0.1	1.24	1.24	0.08
55.00	10.00	3.52	3.61	2.3	6.90	7.00	1.5	1.96	1.94	0.90
55.00	15.00	4.04	4.00	1.0	7.85	7.80	0.6	1.94	1.95	0.38
Sum				5.2			3.4			2.36
RMS_{COP}	$3.49e-02$									
$RMS_{Q_{cond}}$	$4.22e-02$									
$RMS_{W_{comp}}$	$7.20e-03$									

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

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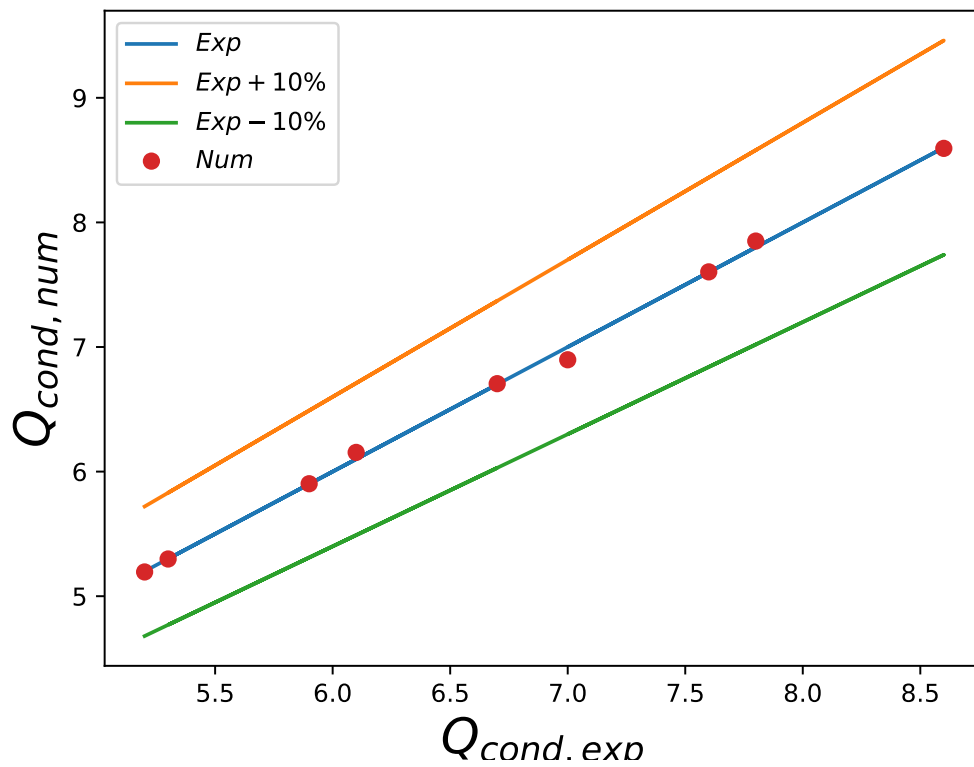HOCHSCHULE FÜR TECHNIK
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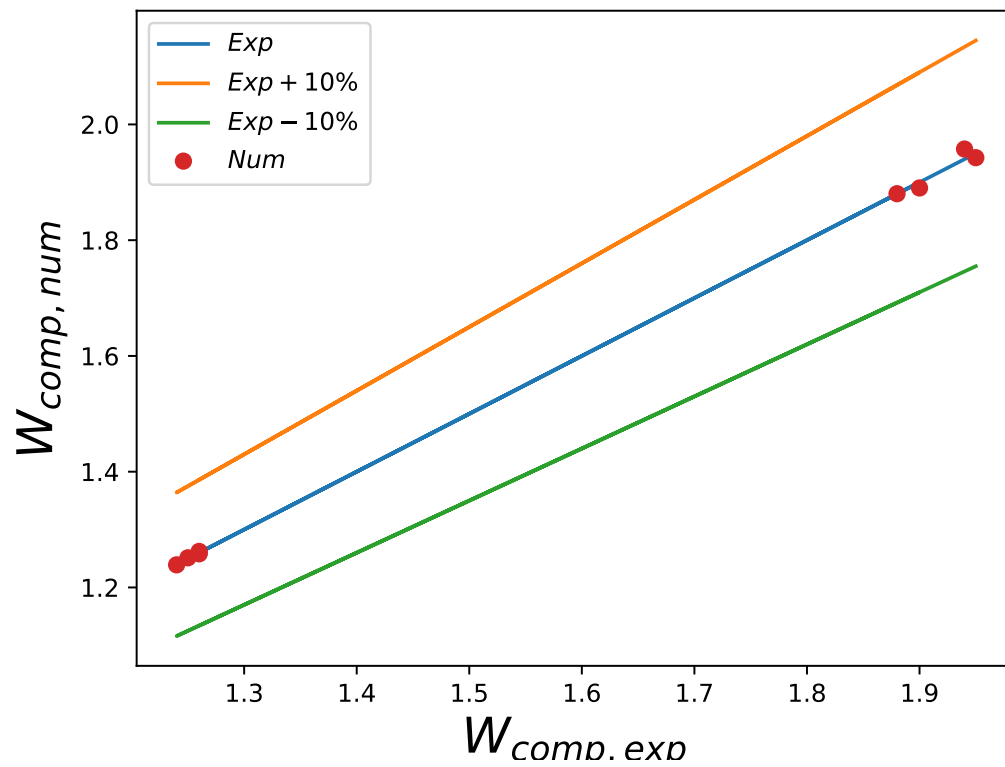
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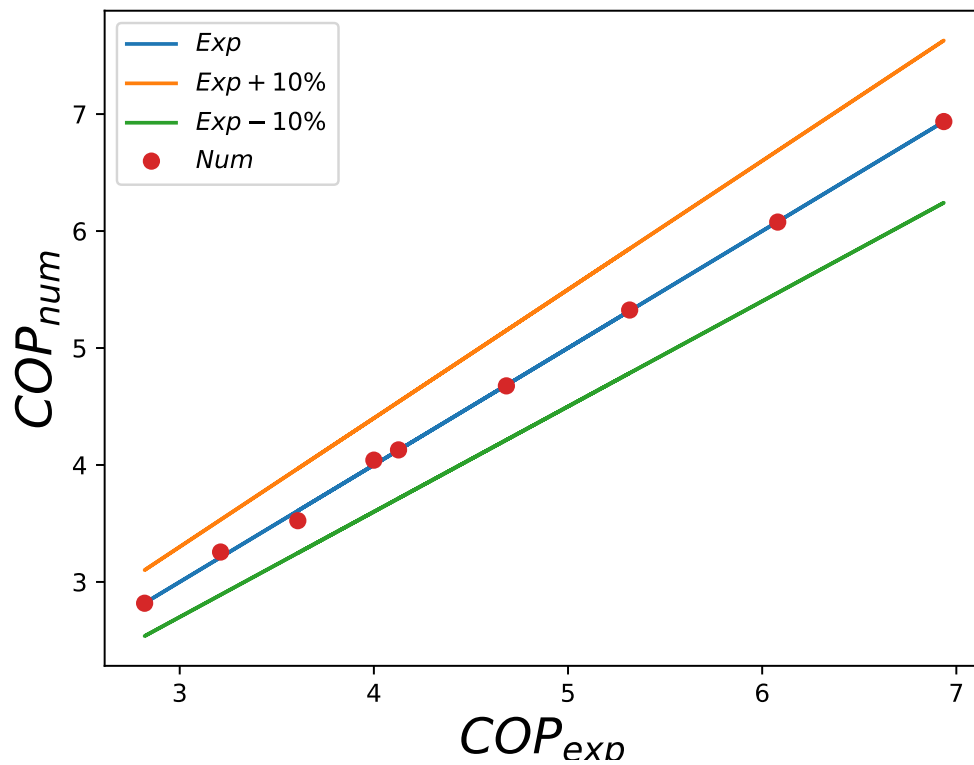
Figure 2: W_{comp} differences between experiments and fitted data

Figure 3: COP differences between experiments and fitted data