INSTITUT FÜR SOLARTECHNIK

HSR HOCHSCHULE FÜR TECHNIK RAPPERSWIL
FHO Fachhochschule Ostschweiz

Python calculation for heat pump SIN-6TU

Parametric Heat Pump calculation

Dani Carbonell
dani.carbonell@solarenergy.ch

2019/03/12 at: 16:08:48 h

Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	
		$[kW]$
PQ_1	1^{st} *condenser polynomial coefficient*	5.7227e+00
PQ_2	2^{st} *condenser polynomial coefficient*	5.7862e+01
PQ_3	3^{st} *condenser polynomial coefficient*	1.7105e+01
PQ_4	4^{st} *condenser polynomial coefficient*	-5.8641e+01
PQ_5	5^{st} *condenser polynomial coefficient*	5.0943e+01
PQ_6	6^{st} *condenser polynomial coefficient*	-8.7032e+01
$PCOP_1$	1^{st} *COP polynomial coefficient*	6.4542e+00
$PCOP_2$	2^{st} *COP polynomial coefficient*	6.2041e+01
$PCOP_3$	3^{st} *COP polynomial coefficient*	-3.1154e+00
$PCOP_4$	4^{st} *COP polynomial coefficient*	-2.2610e+02
$PCOP_5$	5^{st} *COP polynomial coefficient*	-5.4317e+01
$PCOP_6$	6^{st} *COP polynomial coefficient*	-7.9441e+01
$\dot{m}_{cond}$	1050.00 $[kg/h]$	
$\dot{m}_{evap}$	1050.00 $[kg/h]$	
COP_{nom} (B0W35)	4.68	
$Q_{c,nom}$ (B0W35)	6.13 kW	
COP_{nom} (B2W35)	4.93	
$Q_{c,nom}$ (B2W35)	6.47 kW	
COP_{nom} (B10W35)	5.90	
$Q_{c,nom}$ (B10W35)	7.89 kW	

Table 2: Predicting results of the heat pump.

$T_{evap,in}$ ^oC	$T_{evap,out}$ ^oC	$T_{cond,in}$ ^oC	$T_{cond,out}$ ^oC	COP [–]	Q_{cond} $[kW]$	Q_{evap} $[kW]$	W_{comp} $[kW]$	$\dot{m}_{cond}$ kg/h	$\dot{m}_{evap}$ kg/h	ΔT_{evap} K	ΔT_{cond} K
-7.00	-10.35	25.94	30.00	4.01	4.97	3.73	1.24	1050	1050	3.3	4.1
-7.00	-10.18	34.72	38.75	3.55	4.93	3.54	1.39	1050	1050	3.2	4.0
-7.00	-9.79	43.63	47.50	2.92	4.72	3.11	1.62	1050	1050	2.8	3.9
-7.00	-9.08	52.68	56.25	2.13	4.36	2.31	2.05	1050	1050	2.1	3.6
-7.00	-7.47	61.84	65.00	1.16	3.87	0.53	3.34	1050	1050	0.5	3.2
-4.00	-7.81	25.53	30.00	4.45	5.46	4.24	1.23	1050	1050	3.8	4.5
-4.00	-7.62	34.32	38.75	3.92	5.41	4.03	1.38	1050	1050	3.6	4.4
-4.00	-7.22	43.25	47.50	3.22	5.20	3.58	1.61	1050	1050	3.2	4.3
-4.00	-6.49	52.31	56.25	2.35	4.82	2.77	2.05	1050	1050	2.5	3.9
-4.00	-4.90	61.47	65.00	1.30	4.31	1.00	3.31	1050	1050	0.9	3.5
-1.00	-5.27	25.11	30.00	4.87	5.97	4.75	1.23	1050	1050	4.3	4.9
-1.00	-5.07	33.92	38.75	4.27	5.91	4.53	1.38	1050	1050	4.1	4.8
-1.00	-4.65	42.85	47.50	3.51	5.68	4.06	1.62	1050	1050	3.6	4.6
-1.00	-3.90	51.92	56.25	2.56	5.29	3.22	2.06	1050	1050	2.9	4.3
-1.00	-2.31	61.10	65.00	1.44	4.77	1.46	3.31	1050	1050	1.3	3.9
2.00	-2.73	24.69	30.00	5.29	6.49	5.27	1.23	1050	1050	4.7	5.3
2.00	-2.52	33.50	38.75	4.62	6.42	5.03	1.39	1050	1050	4.5	5.2
2.00	-2.08	42.45	47.50	3.78	6.17	4.54	1.63	1050	1050	4.1	5.1
2.00	-1.31	51.53	56.25	2.77	5.77	3.69	2.08	1050	1050	3.3	4.7
2.00	0.29	60.71	65.00	1.57	5.24	1.90	3.33	1050	1050	1.7	4.3
5.00	-0.20	24.25	30.00	5.70	7.02	5.79	1.23	1050	1050	5.2	5.7
5.00	0.03	33.08	38.75	4.96	6.93	5.54	1.40	1050	1050	5.0	5.7
5.00	0.48	42.04	47.50	4.05	6.68	5.03	1.65	1050	1050	4.5	5.5
5.00	1.27	51.13	56.25	2.97	6.26	4.15	2.11	1050	1050	3.7	5.1
5.00	2.89	60.32	65.00	1.69	5.72	2.34	3.37	1050	1050	2.1	4.7
8.00	2.32	23.81	30.00	6.11	7.56	6.33	1.24	1050	1050	5.7	6.2
8.00	2.56	32.64	38.75	5.30	7.46	6.05	1.41	1050	1050	5.4	6.1
8.00	3.03	41.61	47.50	4.32	7.19	5.53	1.67	1050	1050	5.0	5.9
8.00	3.85	50.71	56.25	3.16	6.77	4.62	2.14	1050	1050	4.2	5.5
8.00	5.50	59.92	65.00	1.81	6.21	2.78	3.43	1050	1050	2.5	5.1
11.00	4.83	23.36	30.00	6.50	8.12	6.87	1.25	1050	1050	6.2	6.6
11.00	5.09	32.20	38.75	5.62	8.00	6.58	1.42	1050	1050	5.9	6.5
11.00	5.58	41.18	47.50	4.57	7.72	6.03	1.69	1050	1050	5.4	6.3
11.00	6.42	50.29	56.25	3.34	7.28	5.10	2.18	1050	1050	4.6	6.0
11.00	8.11	59.50	65.00	1.92	6.72	3.22	3.50	1050	1050	2.9	5.5
14.00	7.33	22.90	30.00	6.89	8.68	7.42	1.26	1050	1050	6.7	7.1
14.00	7.61	31.75	38.75	5.94	8.55	7.11	1.44	1050	1050	6.4	7.0
14.00	8.12	40.74	47.50	4.82	8.26	6.55	1.71	1050	1050	5.9	6.8
14.00	8.98	49.86	56.25	3.52	7.81	5.59	2.22	1050	1050	5.0	6.4
14.00	10.71	59.08	65.00	2.02	7.24	3.66	3.58	1050	1050	3.3	5.9
17.00	9.83	22.43	30.00	7.27	9.25	7.98	1.27	1050	1050	7.2	7.6
17.00	10.12	31.30	38.75	6.26	9.11	7.65	1.46	1050	1050	6.9	7.5
17.00	10.65	40.29	47.50	5.06	8.81	7.07	1.74	1050	1050	6.3	7.2
17.00	11.54	49.42	56.25	3.69	8.34	6.08	2.26	1050	1050	5.5	6.8
17.00	13.32	58.64	65.00	2.12	7.77	4.10	3.67	1050	1050	3.7	6.4
20.00	12.32	21.95	30.00	7.65	9.83	8.55	1.29	1050	1050	7.7	8.0
20.00	12.63	30.83	38.75	6.56	9.68	8.21	1.48	1050	1050	7.4	7.9
20.00	13.17	39.84	47.50	5.30	9.37	7.60	1.77	1050	1050	6.8	7.7
20.00	14.09	48.97	56.25	3.85	8.89	6.58	2.31	1050	1050	5.9	7.3
20.00	15.92	58.20	65.00	2.20	8.31	4.54	3.77	1050	1050	4.1	6.8

Meier/SIN-6TU/SIN-6TU-Cop.pdf

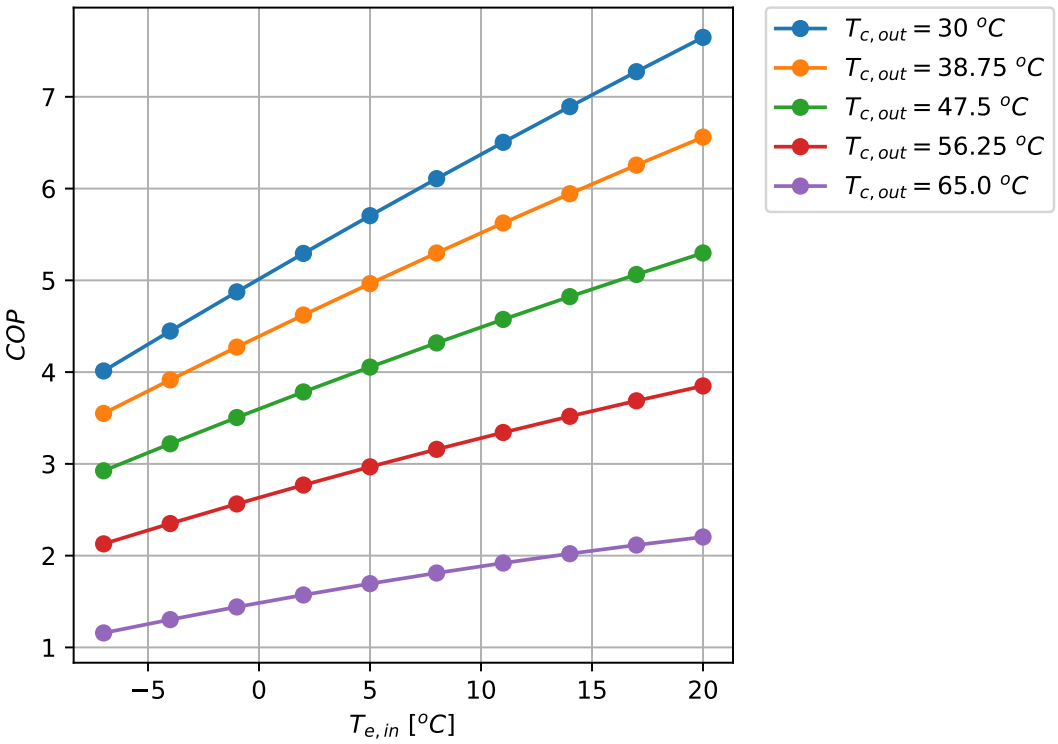

Figure 1: COP Results for the heat pump at the selected points

Meier/SIN-6TU/SIN-6TU-Qc.pdf

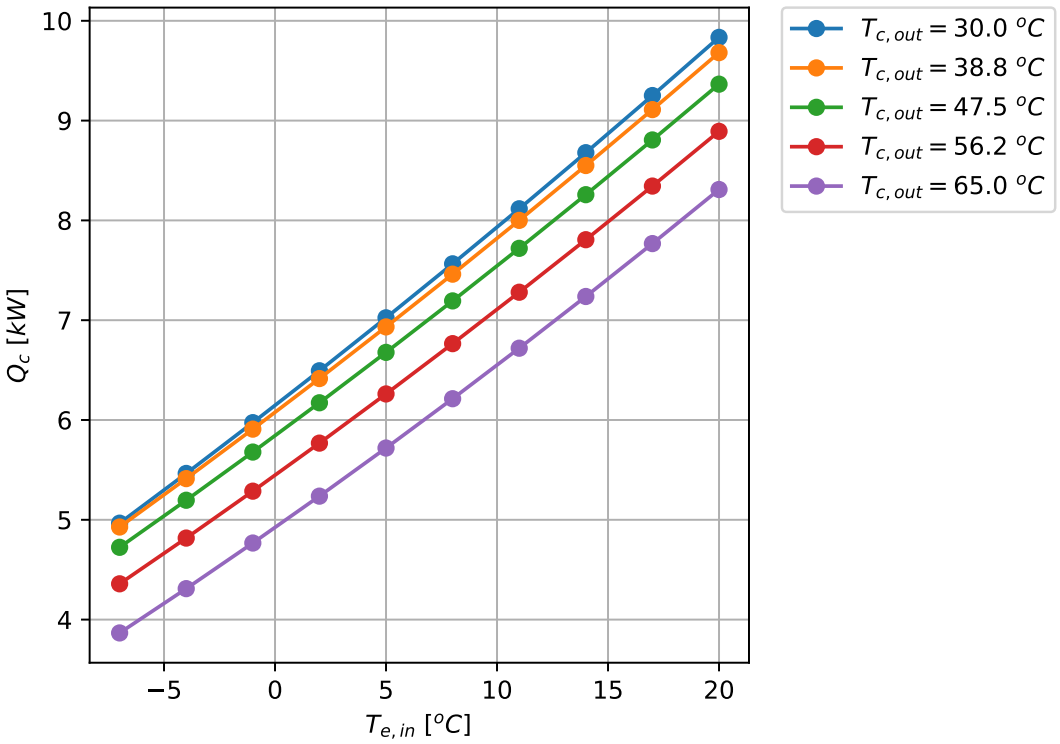

Figure 2: Q_c Results for the heat pump at the selected points