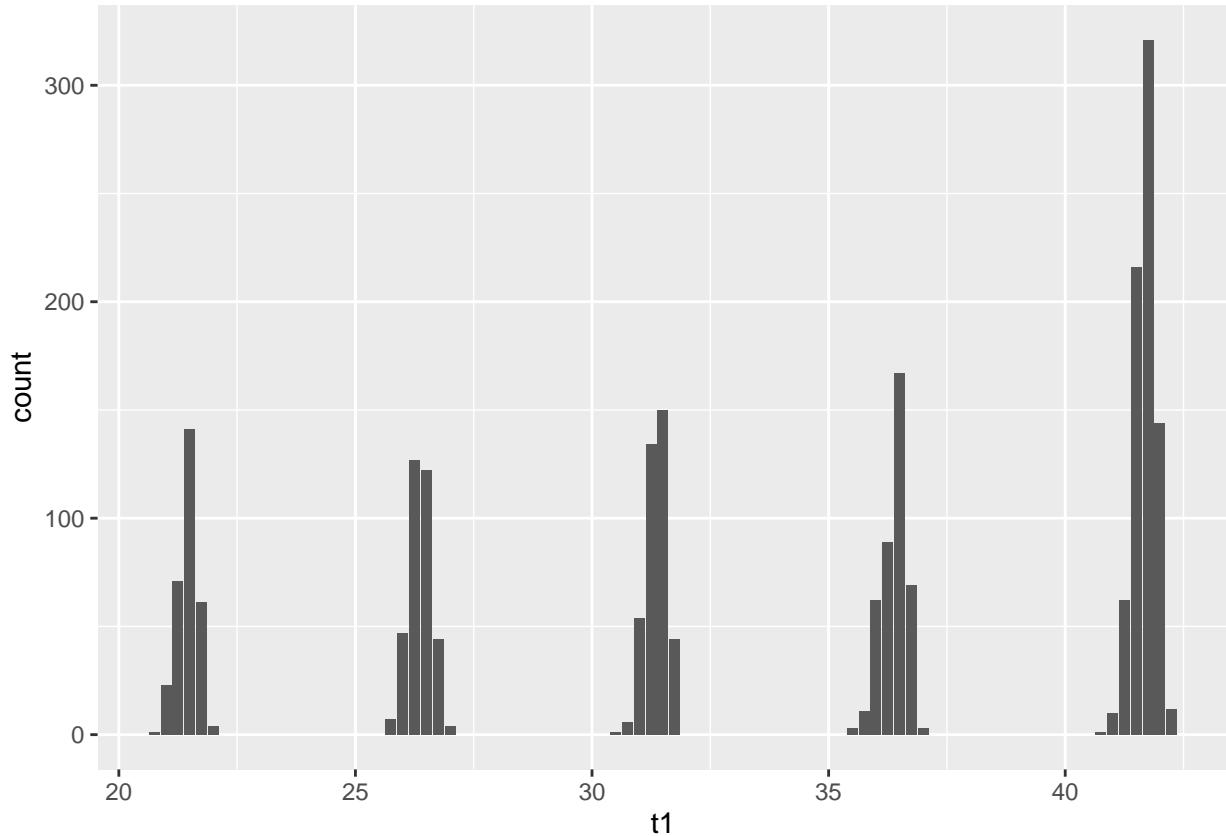


R Notebook

Este relatório apresenta a caracterização de 6 termopares tipo K juntamente aos módulos de leitura MAX6675. O experimento de caracterização consistiu de 5 ensaios nas temperaturas de 20°C, 25°C, 30°C, 35°C e 40 °C, com uma incerteza de ± 0.1 °C.

```
##               horario    t1     t2     t3     t4     t5     t6
## 1 1970-01-01 15:05:29 21.25 21.50 20.75 22.00 21.75 21.50
## 2 1970-01-01 15:05:30 21.25 21.50 20.25 22.25 21.50 21.75
## 3 1970-01-01 15:05:31 21.50 21.50 20.50 22.25 21.75 21.50
## 4 1970-01-01 15:05:32 21.75 21.00 20.50 22.25 21.50 21.50
## 5 1970-01-01 15:05:33 21.50 21.50 21.00 22.50 21.50 21.25
## 6 1970-01-01 15:05:34 21.75 21.25 21.00 22.50 22.00 21.00
```



Separando ensaios em dataframes diferentes

	horario	t1	t2	t3	t4	t5	t6
296	1970-01-01 15:10:24	21.00	21.00	20.75	22.25	21.25	21.50
297	1970-01-01 15:10:25	21.25	21.25	21.00	21.75	21.25	21.75

	horario	t1	t2	t3	t4	t5	t6
298	1970-01-01 15:10:26	21.00	21.25	20.50	22.25	21.75	21.25
299	1970-01-01 15:10:27	21.50	21.50	20.75	21.75	21.25	21.75
300	1970-01-01 15:10:28	21.50	21.00	20.50	21.75	21.50	21.75
301	1970-01-01 15:10:29	21.50	20.75	20.50	22.00	21.25	21.25

	horario	t1	t2	t3	t4	t5	t6
647	1970-01-01 15:39:17	26.25	26.50	25.75	26.75	26.50	26.75
648	1970-01-01 15:39:18	26.75	26.25	25.75	27.25	26.25	26.00
649	1970-01-01 15:39:19	26.50	26.25	25.25	27.00	26.50	26.00
650	1970-01-01 15:39:20	26.75	26.50	26.00	27.25	26.50	26.50
651	1970-01-01 15:39:21	26.00	26.50	25.75	27.25	26.00	26.25
652	1970-01-01 15:39:22	26.75	26.25	24.75	27.25	26.75	26.50

	horario	t1	t2	t3	t4	t5	t6
1036	1970-01-01 16:01:20	31.25	30.50	29.00	32.25	31.50	31.25
1037	1970-01-01 16:01:21	31.50	30.25	29.25	32.25	31.25	31.25
1038	1970-01-01 16:01:22	31.50	30.75	29.50	32.25	31.00	31.25
1039	1970-01-01 16:01:23	31.50	30.75	29.75	31.75	31.00	31.00
1040	1970-01-01 16:01:24	31.50	31.00	30.00	32.25	31.50	31.25
1041	1970-01-01 16:01:25	31.75	30.75	29.50	32.25	31.25	31.00

	horario	t1	t2	t3	t4	t5	t6
1440	1970-01-01 19:28:52	36.50	36.00	34.50	37.25	36.50	36.00
1441	1970-01-01 19:28:53	36.50	35.50	34.25	37.50	36.50	36.00
1442	1970-01-01 19:28:54	36.75	35.50	34.25	37.00	36.75	36.00
1443	1970-01-01 19:28:55	36.50	36.00	34.00	37.00	36.75	36.25
1444	1970-01-01 19:28:56	36.50	36.25	34.25	37.00	36.25	36.00
1445	1970-01-01 19:28:57	36.50	35.75	34.25	37.25	36.75	36.25

	horario	t1	t2	t3	t4	t5	t6
2206	1970-01-01 20:04:25	42.00	41.25	39.25	42.00	41.75	41.00
2207	1970-01-01 20:04:26	42.00	41.00	39.50	42.75	41.75	41.25
2208	1970-01-01 20:04:27	41.50	41.00	39.75	42.25	41.75	41.25
2209	1970-01-01 20:04:28	41.50	41.00	39.75	42.25	41.50	41.50
2210	1970-01-01 20:04:29	41.75	40.75	39.00	42.50	40.75	41.25
2211	1970-01-01 20:04:30	41.50	41.25	39.25	42.75	41.50	41.50

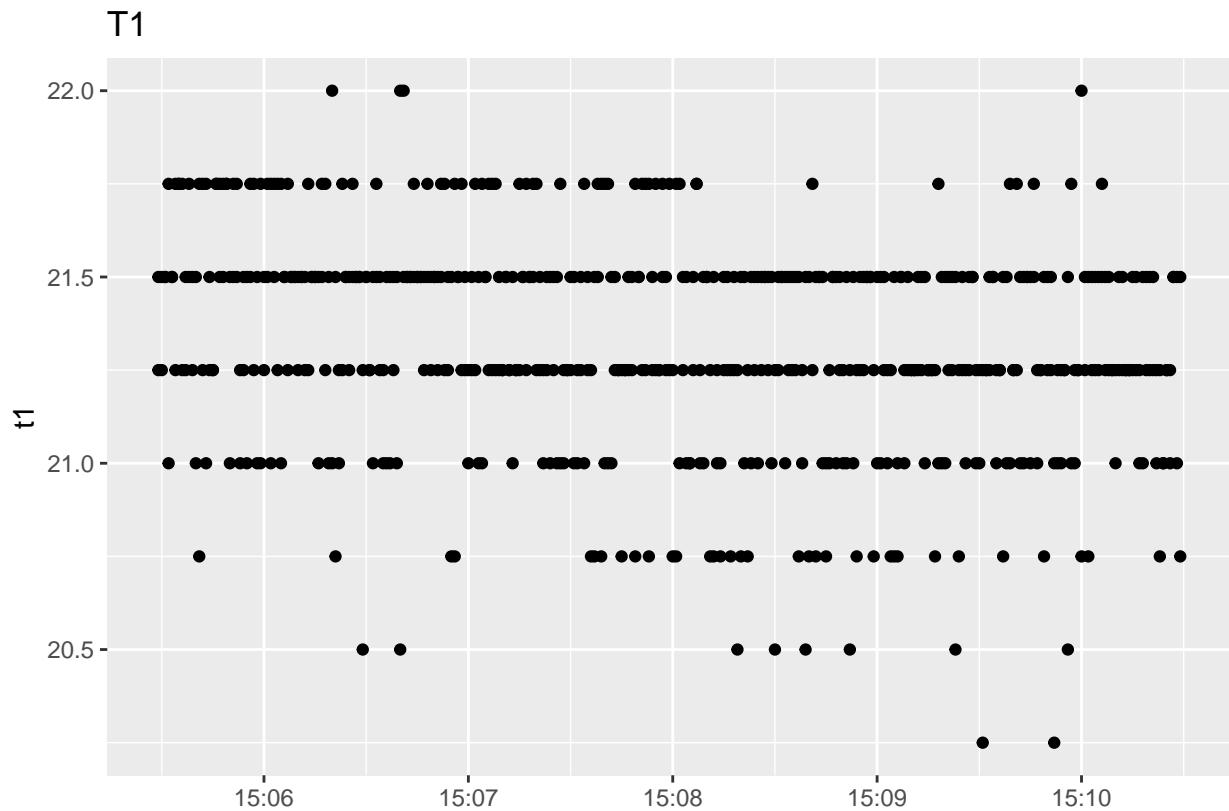
pivoting data:

```
## # A tibble: 6 x 3
##   horario      name temperatura
##   <dttm>     <chr>     <dbl>
## 1 1970-01-01 15:05:29 t1        21.2
## 2 1970-01-01 15:05:29 t2        21.5
```

```

## 3 1970-01-01 15:05:29 t3      20.8
## 4 1970-01-01 15:05:29 t4      22
## 5 1970-01-01 15:05:29 t5      21.8
## 6 1970-01-01 15:05:29 t6      21.5

```



Media dos ensaios

```

##      t1      t2      t3      t4      t5      t6
## 21.45764 21.19020 20.75498 22.00498 21.51412 21.51827

##      t1      t2      t3      t4      t5      t6
## 26.36467 26.09758 25.51211 26.85114 26.24430 26.24430

##      t1      t2      t3      t4      t5      t6
## 31.35861 30.74550 29.54563 31.88303 31.14267 31.01028

##      t1      t2      t3      t4      t5      t6
## 36.38676 35.76176 34.25928 37.10087 36.33106 36.08168

##      t1      t2      t3      t4      t5      t6
## 41.68277 40.98368 39.48564 42.39360 41.56560 41.23107

```

Erro Absoluto

- ea1 -> ensaio 1 (20°C)
- ea2 -> ensaio 2 (25°C) ...
- ea5 -> ensaio 5 (40°C)

Erro relativo

Média da diferença entre medidas e máxima diferença entre medidas de cada ensaio

```
## [1] "Ensaio 1 (20 C)"
```

```
## [1] 0.4050388
## [1] 1.25
```

```
## [1] "Ensaio 2 (25 C)"
```

```
## [1] 0.4164688
## [1] 1.339031
```

```
## [1] "Ensaio 3 (30 C)"
```

```
## [1] 0.506391
## [1] 1.428663
```

```
## [1] "Ensaio 4 (35 C)"
```

```
## [1] 0.4958402
## [1] 1.360149
```

```
## [1] "Ensaio 5 (40 C)"
```

```
## [1] 0.6571113
## [1] 1.879243
```