cst_test_plots

March 20, 2022

1 Critical Stability Task Plots

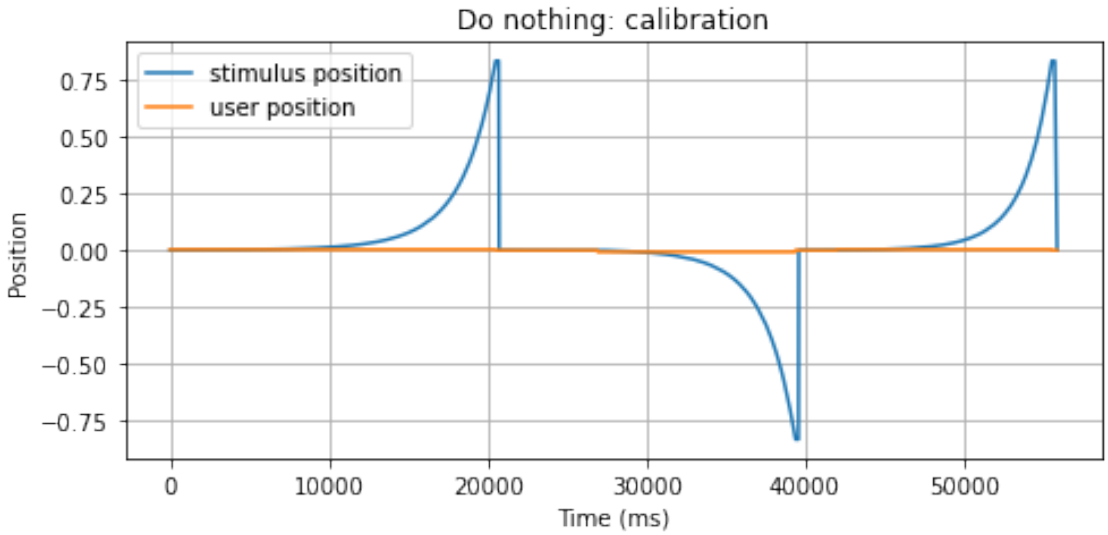
1.1 1a. Do nothing: calibration

[1]:
```
import pandas as pd
from matplotlib import pyplot as plt
plt.rcParams["figure.figsize"] = [7.00, 3.50]
plt.rcParams["figure.autolayout"] = True
columns =␣
 ↪['lambda_value','lambda_slope','stim_position','timestamp','user_position']
```

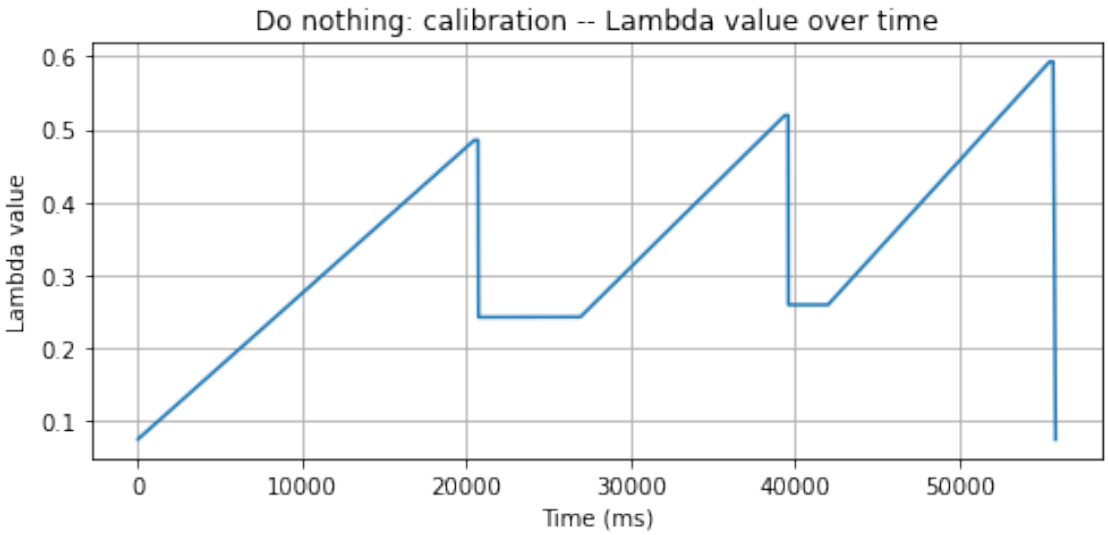
[2]:
```
csv_file = '/Users/arno.klein/Desktop/CST_20220318/do-nothing/
 ↪6234941ade7a36762057f282_calibration-phase.csv'
df = pd.read_csv(csv_file, usecols=columns)
print("Contents in csv file:\n", df)
plt.plot(df.timestamp, df.stim_position, label='stimulus position')
plt.plot(df.timestamp, df.user_position, label='user position')
plt.title('Do nothing: calibration')
plt.xlabel ('Time (ms)')
plt.ylabel ('Position')
plt.legend()
plt.grid()
plt.show()
```

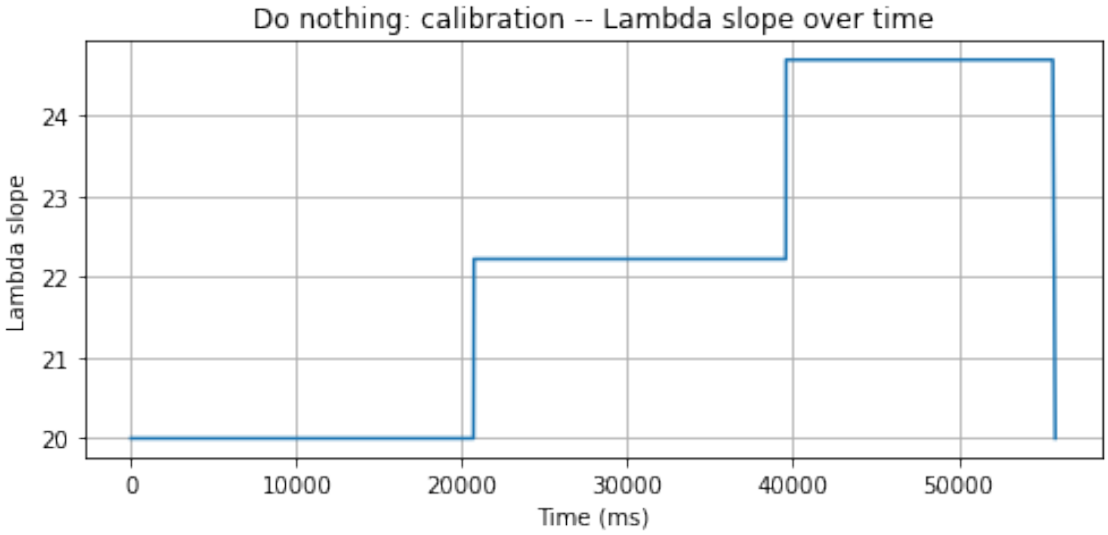
```
Contents in csv file:
       lambda_value  lambda_slope  stim_position  timestamp  user_position
0          0.075520     20.000000       0.000005          0        0.00273
1          0.075840     20.000000       0.000009         14        0.00273
2          0.076180     20.000000       0.000012         33        0.00273
3          0.076680     20.000000       0.000017         57        0.00273
4          0.076840     20.000000       0.000019         64        0.00273
…               …             …              …          …              …
3327       0.592415     24.691358       0.836566      55651        0.00000
3328       0.592415     24.691358       0.836566      55667        0.00000
3329       0.592415     24.691358       0.836566      55683        0.00000
3330       0.592415     24.691358       0.836566      55697        0.00000
3331       0.075000     20.000000       0.000000      55845        0.00000
```

[3332 rows x 5 columns]



[3]:
```
df = pd.read_csv(csv_file, usecols=columns)
plt.plot(df.timestamp, df.lambda_value)
plt.title('Do nothing: calibration -- Lambda value over time')
plt.xlabel ('Time (ms)')
plt.ylabel ('Lambda value')
plt.grid()
plt.show()

df = pd.read_csv(csv_file, usecols=columns)
plt.plot(df.timestamp, df.lambda_slope)
plt.title('Do nothing: calibration -- Lambda slope over time')
plt.xlabel ('Time (ms)')
plt.ylabel ('Lambda slope')
plt.grid()
plt.show()
```



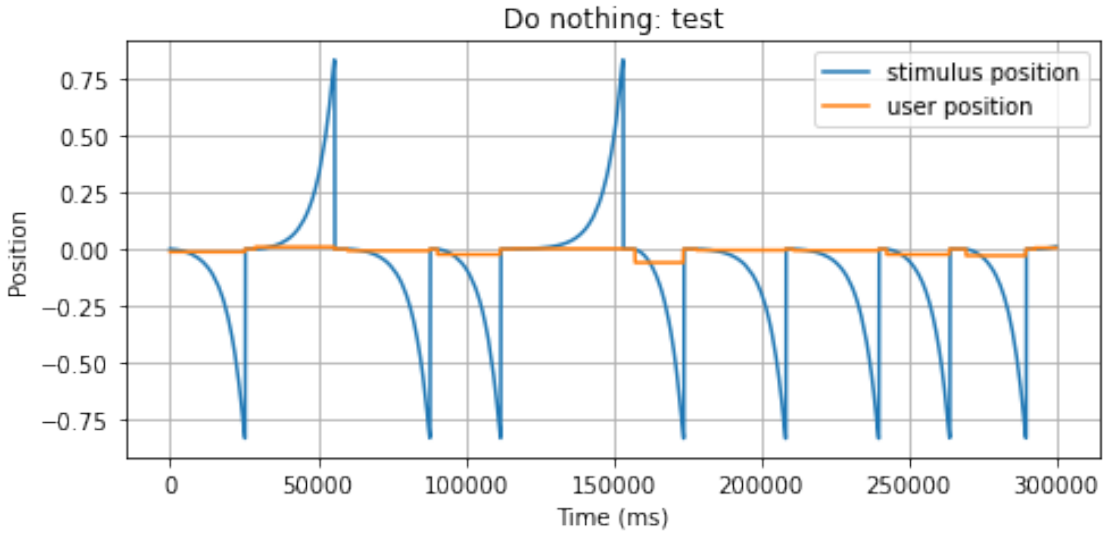


1.2 1b. Do nothing: test

[4]:
```
csv_file = '/Users/arno.klein/Desktop/CST_20220318/do-nothing/
 ↪6234941ade7a36762057f282_continuous-phase.csv'
df = pd.read_csv(csv_file, usecols=columns)
print("Contents in csv file:\n", df)
plt.plot(df.timestamp, df.stim_position, label='stimulus position')
plt.plot(df.timestamp, df.user_position, label='user position')
plt.title('Do nothing: test')
plt.xlabel ('Time (ms)')
```

```
plt.ylabel ('Position')
plt.legend()
plt.grid()
plt.show()
```

```
Contents in csv file:
        lambda_value  lambda_slope  stim_position  timestamp  user_position
0           0.075640            20      -0.000030          0      -0.012576
1           0.075960            20      -0.000045         17      -0.012576
2           0.076300            20      -0.000062         38      -0.012576
3           0.076540            20      -0.000073         44      -0.012576
4           0.076960            20      -0.000094         65      -0.012576
…                …             …              …          …              …
17930       0.177725            20       0.010059     299893       0.005281
17931       0.177725            20       0.010103     299910       0.005281
17932       0.177725            20       0.010149     299926       0.005281
17933       0.177725            20       0.010196     299943       0.005281
17934       0.177725            20       0.010243     299960       0.005281

[17935 rows x 5 columns]
```

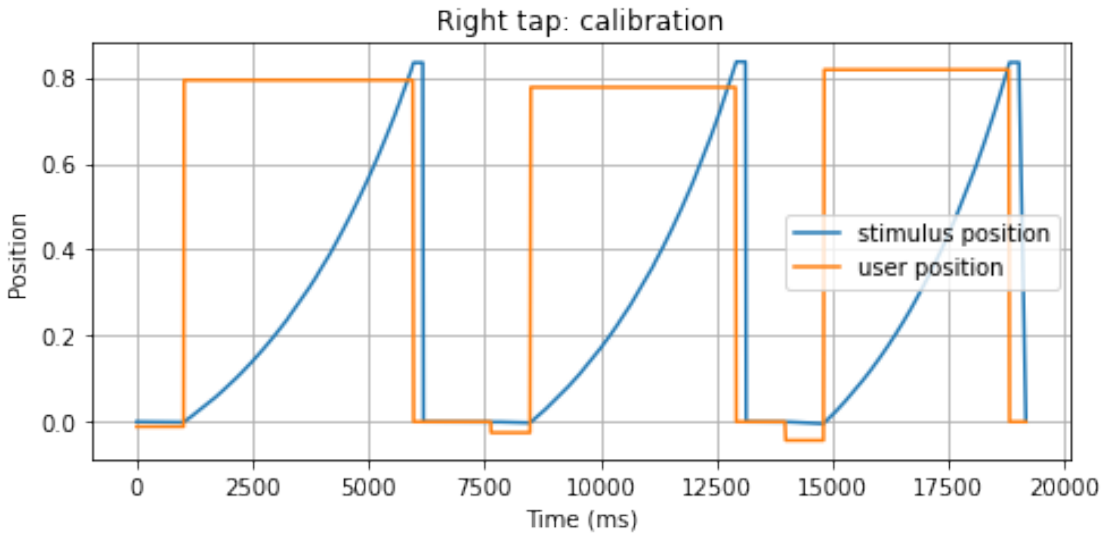


1.3 2a. Right tap: calibration

[5]:
```
csv_file = '/Users/arno.klein/Desktop/CST_20220318/tap-once/
 ↪623496a8de7a36762057f283_calibration-phase.csv'
df = pd.read_csv(csv_file, usecols=columns)
print("Contents in csv file:\n", df)
plt.plot(df.timestamp, df.stim_position, label='stimulus position')
```

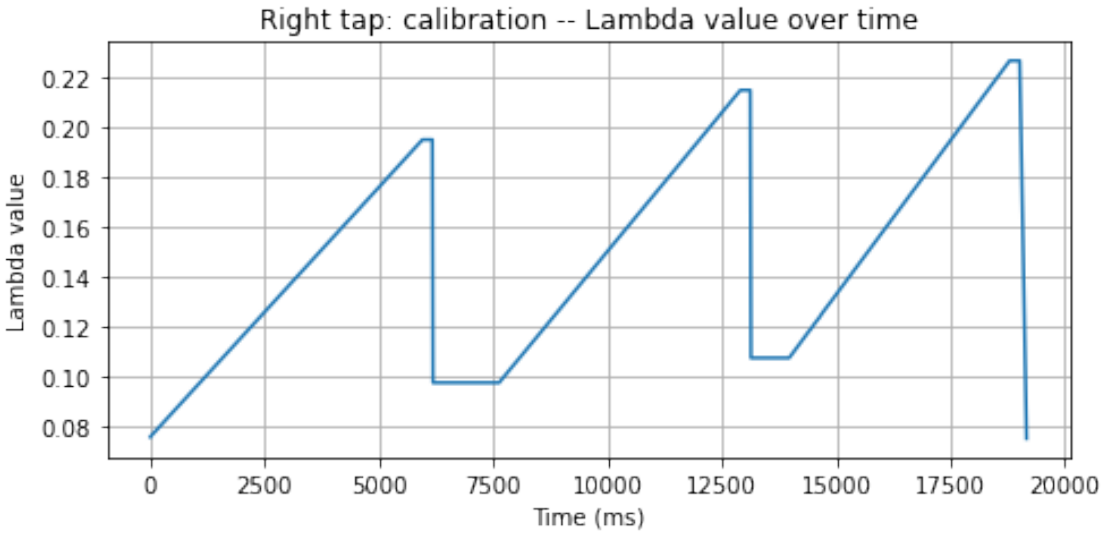
```
plt.plot(df.timestamp, df.user_position, label='user position')
plt.title('Right tap: calibration')
plt.xlabel ('Time (ms)')
plt.ylabel ('Position')
plt.legend()
plt.grid()
plt.show()
```

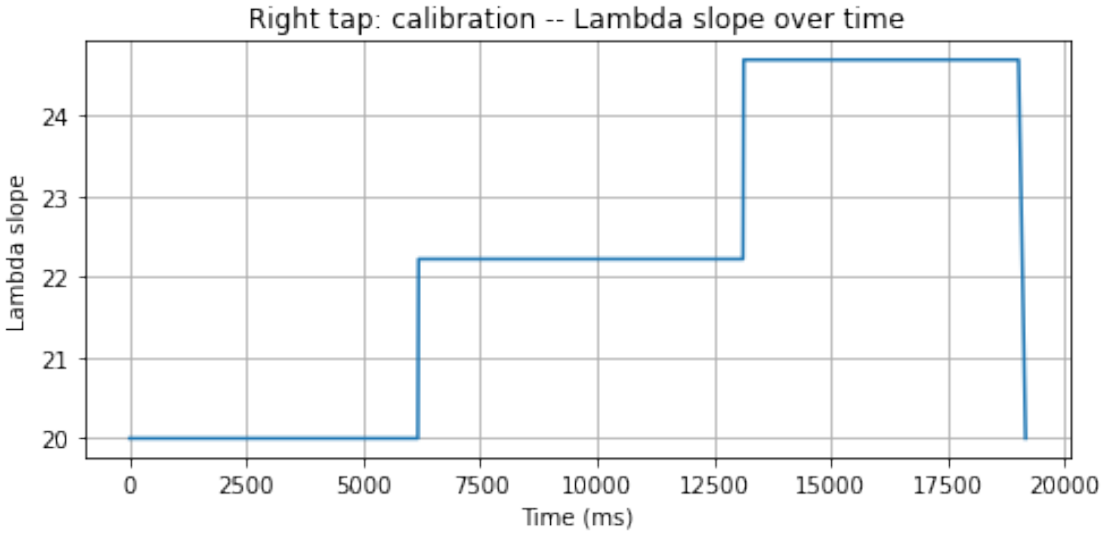
```
Contents in csv file:
      lambda_value  lambda_slope  stim_position  timestamp  user_position
0         0.075600     20.000000      -0.000025          0      -0.011301
1         0.075940     20.000000      -0.000040         10      -0.011301
2         0.076260     20.000000      -0.000054         25      -0.011301
3         0.076600     20.000000      -0.000068         43      -0.011301
4         0.076940     20.000000      -0.000083         60      -0.011301
…              …             …              …          …              …
1136      0.226442     24.691358       0.834777      18961       0.000000
1137      0.226442     24.691358       0.834777      18976       0.000000
1138      0.226442     24.691358       0.834777      18993       0.000000
1139      0.226442     24.691358       0.834777      19011       0.000000
1140      0.075000     20.000000       0.000000      19161       0.000000

[1141 rows x 5 columns]
```



[6]:
```
df = pd.read_csv(csv_file, usecols=columns)
plt.plot(df.timestamp, df.lambda_value)
plt.title('Right tap: calibration -- Lambda value over time')
plt.xlabel ('Time (ms)')
plt.ylabel ('Lambda value')
```

```
plt.grid()
plt.show()

df = pd.read_csv(csv_file, usecols=columns)
plt.plot(df.timestamp, df.lambda_slope)
plt.title('Right tap: calibration -- Lambda slope over time')
plt.xlabel ('Time (ms)')
plt.ylabel ('Lambda slope')
plt.grid()
plt.show()
```

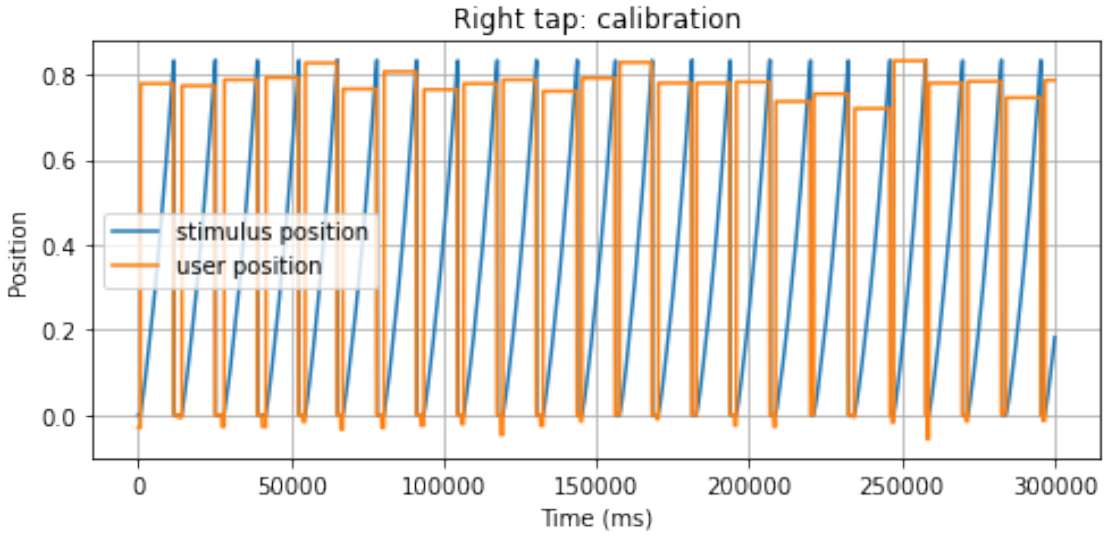




1.4 2b. Right tap: test

[7]:
```
csv_file = '/Users/arno.klein/Desktop/CST_20220318/tap-once/
 ↪623496a8de7a36762057f283_continuous-phase.csv'
df = pd.read_csv(csv_file, usecols=columns)
print("Contents in csv file:\n", df)
plt.plot(df.timestamp, df.stim_position, label='stimulus position')
plt.plot(df.timestamp, df.user_position, label='user position')
plt.title('Right tap: calibration')
plt.xlabel ('Time (ms)')
plt.ylabel ('Position')
plt.legend()
plt.grid()
plt.show()
```

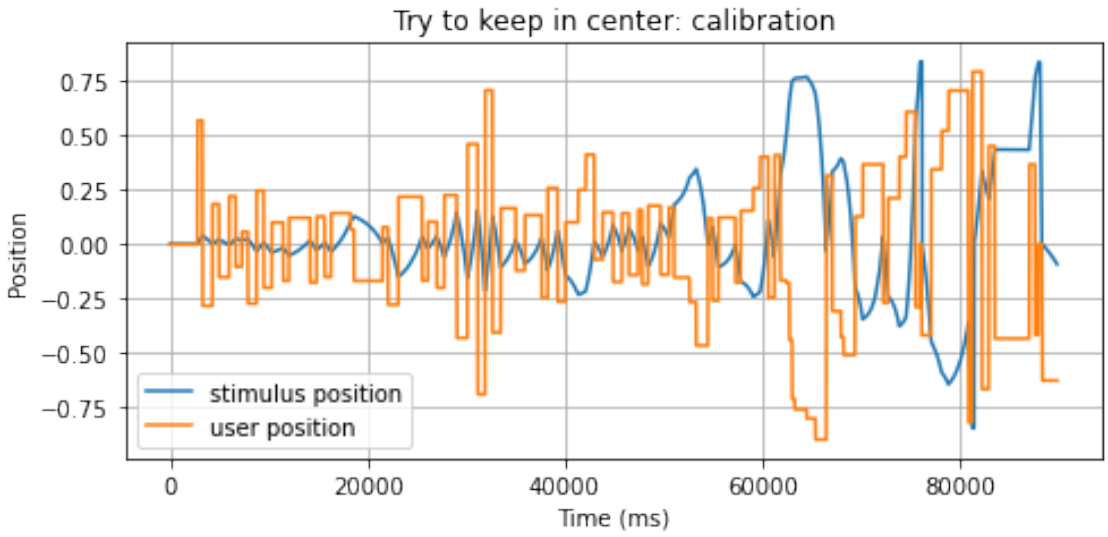
```
Contents in csv file:
        lambda_value  lambda_slope  stim_position  timestamp  user_position
0           0.067933            20      -0.000064          0      -0.030433
1           0.067933            20      -0.000099         18      -0.030433
2           0.067933            20      -0.000132         34      -0.030433
3           0.067933            20      -0.000168         50      -0.030433
4           0.067933            20      -0.000203         68      -0.030433
…                …             …              …          …              …
17943       0.067933            20       0.178096     299904       0.787169
17944       0.067933            20       0.179342     299923       0.787169
17945       0.067933            20       0.180327     299937       0.787169
17946       0.067933            20       0.181378     299952       0.787169
17947       0.067933            20       0.182431     299969       0.787169

[17948 rows x 5 columns]
```



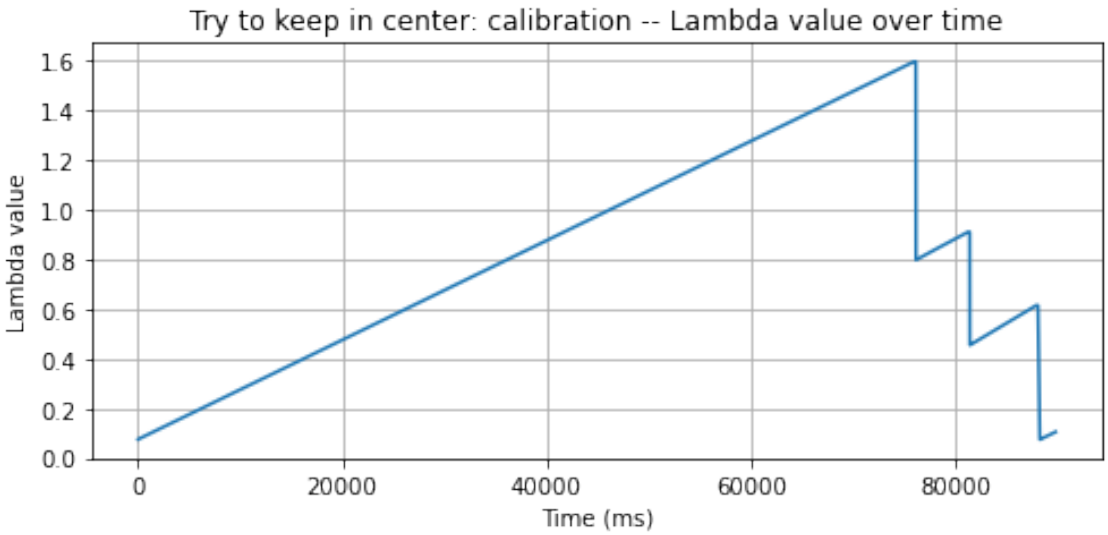
1.5 3a. Try to keep in center: calibration

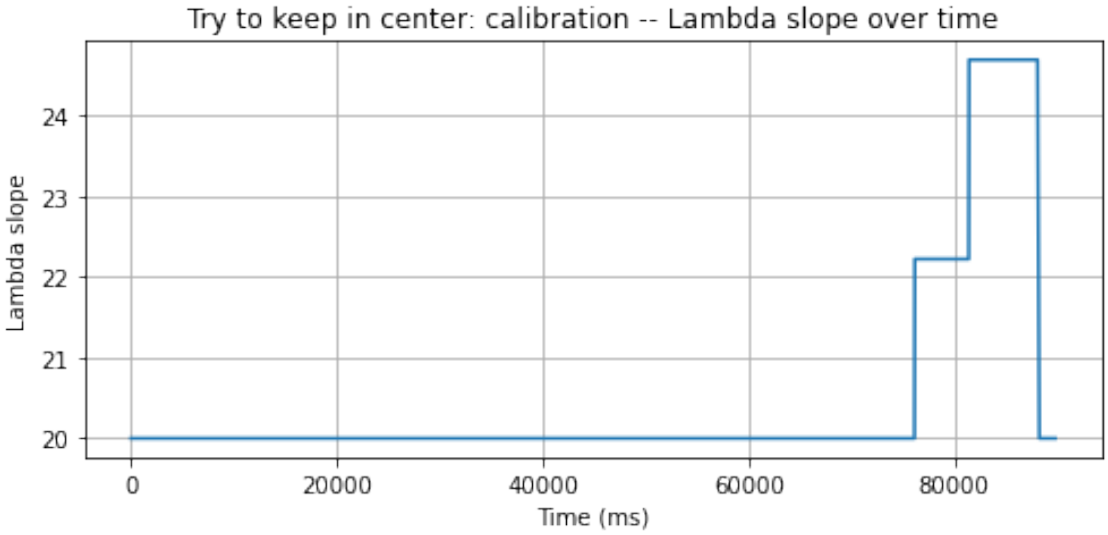
[8]:
```
csv_file = '/Users/arno.klein/Desktop/CST_20220318/try-center/
 ↪6234997ade7a36762057f284_calibration-phase.csv'
df = pd.read_csv(csv_file, usecols=columns)
print("Contents in csv file:\n", df)
plt.plot(df.timestamp, df.stim_position, label='stimulus position')
plt.plot(df.timestamp, df.user_position, label='user position')
plt.title('Try to keep in center: calibration')
plt.xlabel ('Time (ms)')
plt.ylabel ('Position')
plt.legend()
plt.grid()
plt.show()
```

```
Contents in csv file:
       lambda_value  lambda_slope  stim_position  timestamp  user_position
0           0.07560          20.0      -0.000005          0      -0.002372
1           0.07588          20.0      -0.000008          7      -0.002372
2           0.07628          20.0      -0.000012         27      -0.002372
3           0.07660          20.0      -0.000014         44      -0.002372
4           0.07694          20.0      -0.000017         60      -0.002372
…             …             …             …         …             …
5354        0.10430          20.0      -0.087801      89719      -0.627372
5355        0.10464          20.0      -0.089069      89738      -0.627372
5356        0.10498          20.0      -0.090343      89754      -0.627372
5357        0.10530          20.0      -0.091549      89770      -0.627372
5358        0.10564          20.0      -0.092836      89792      -0.627372

[5359 rows x 5 columns]
```



[9]:
```
df = pd.read_csv(csv_file, usecols=columns)
plt.plot(df.timestamp, df.lambda_value)
plt.title('Try to keep in center: calibration -- Lambda value over time')
plt.xlabel ('Time (ms)')
plt.ylabel ('Lambda value')
plt.grid()
plt.show()

df = pd.read_csv(csv_file, usecols=columns)
plt.plot(df.timestamp, df.lambda_slope)
plt.title('Try to keep in center: calibration -- Lambda slope over time')
plt.xlabel ('Time (ms)')
plt.ylabel ('Lambda slope')
plt.grid()
plt.show()
```



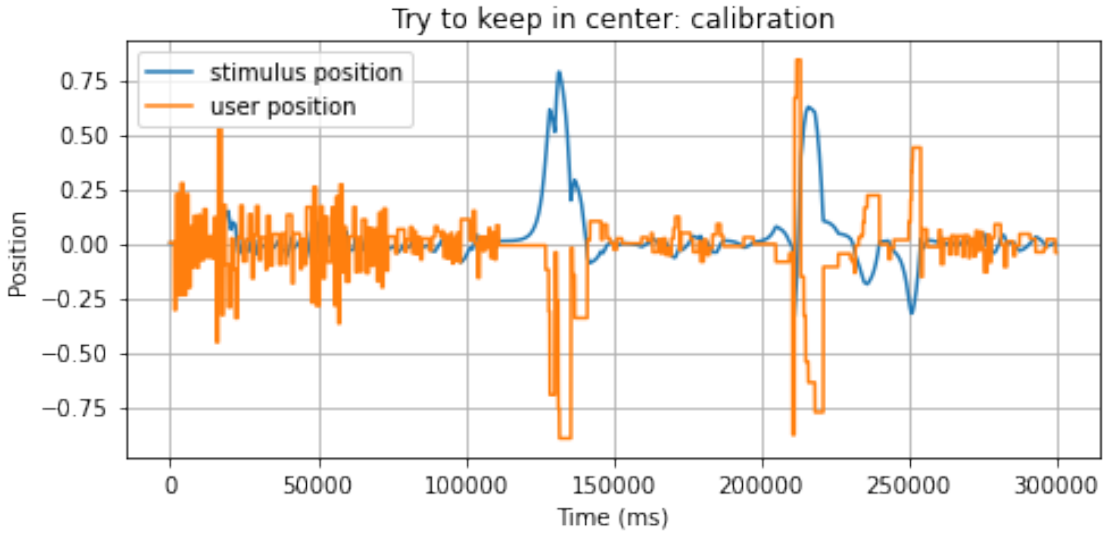


1.6 3b. Try to keep in center: test

[10]:
```
csv_file = '/Users/arno.klein/Desktop/CST_20220318/try-center/
 ↪6234997ade7a36762057f284_continuous-phase.csv'
df = pd.read_csv(csv_file, usecols=columns)
print("Contents in csv file:\n", df)
plt.plot(df.timestamp, df.stim_position, label='stimulus position')
plt.plot(df.timestamp, df.user_position, label='user position')
plt.title('Try to keep in center: calibration')
plt.xlabel ('Time (ms)')
```

```
plt.ylabel ('Position')
plt.legend()
plt.grid()
plt.show()
```

```
Contents in csv file:
        lambda_value  lambda_slope  stim_position  timestamp  user_position
0           0.075580            20       0.000006          0       0.002730
1           0.075900            20       0.000009         21       0.002730
2           0.076240            20       0.000013         35       0.002730
3           0.076580            20       0.000016         50       0.002730
4           0.076920            20       0.000020         67       0.002730
…                …             …              …          …              …
17942       0.478092            20      -0.004836     299898      -0.043188
17943       0.478092            20      -0.005226     299916      -0.043188
17944       0.478092            20      -0.005596     299931      -0.043188
17945       0.478092            20      -0.005993     299948      -0.043188
17946       0.478092            20      -0.006369     299965      -0.043188

[17947 rows x 5 columns]
```



[ ]: