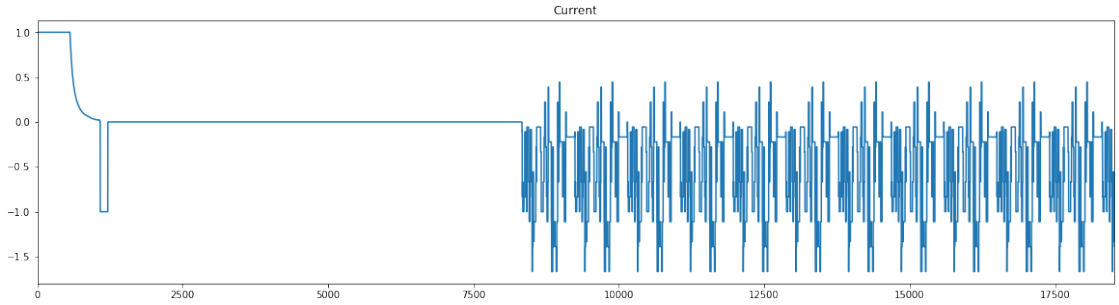
soc_bjdst

April 19, 2018

In [1]:
```
%matplotlib inline
import matplotlib.pyplot as plt
import pandas as pd



file = r'../data/BJDST/SP2_0C_BJDST/02_27_2016_SP20-2_0C_BJDST_80SOC.xls'
xls = pd.ExcelFile(file)
df = pd.read_excel(xls, 'Channel_1-006')

# df = pd.read_excel(open(file,'rb'), sheet_name='Channel_1-006')


# get colum names
# print(list(df))

#
```

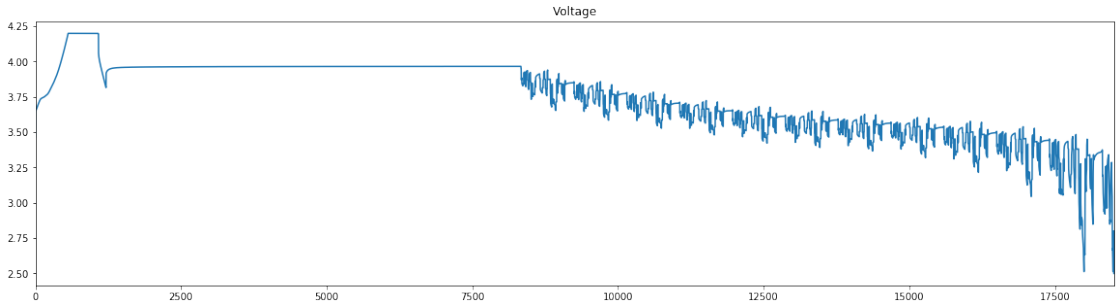
In [2]:
```
df['Current(A)'].plot(title='Current', figsize=(20, 5))
```

Out[2]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e2c39b1d0>



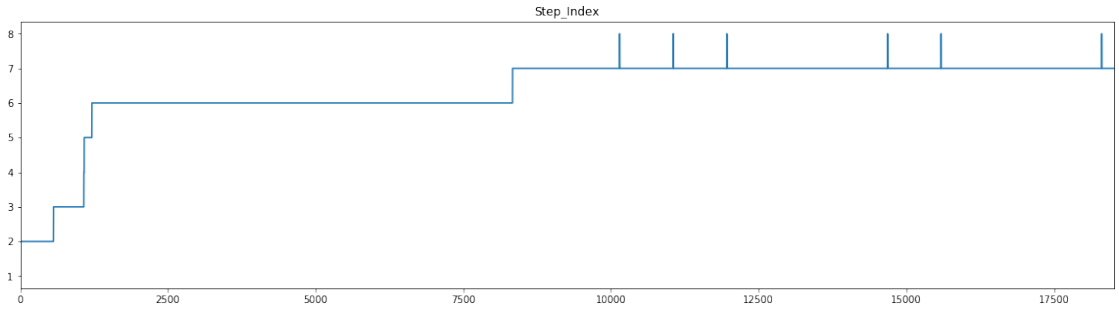
In [3]:
```
df['Voltage(V)'].plot(title='Voltage', figsize=(20, 5))
```

Out[3]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e2c06d310>



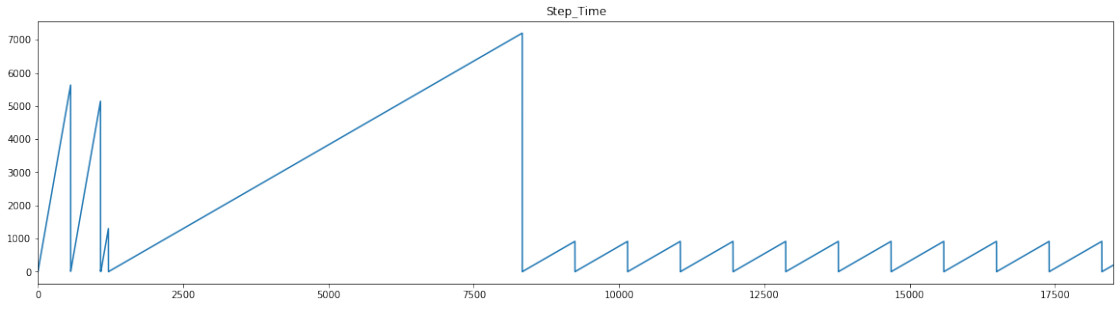

```
In [4]: df['Step_Index'].plot(title='Step_Index' , figsize=(20, 5))
```

```
Out[4]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e2c207250>
```



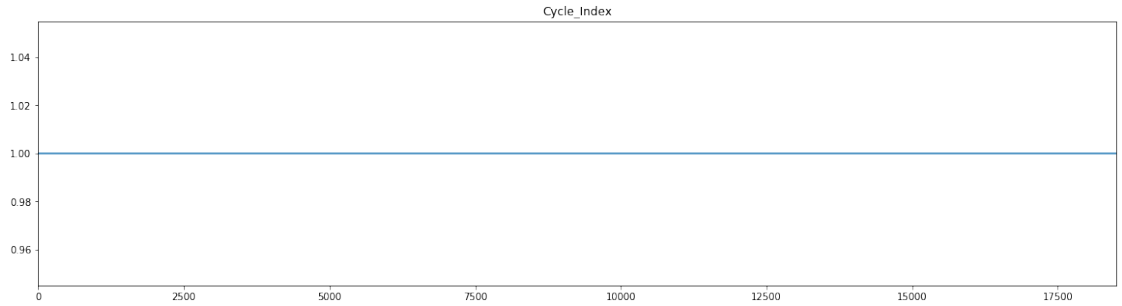

```
In [5]: df['Step_Time(s)'].plot(title='Step_Time' , figsize=(20, 5))
```

```
Out[5]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e26746850>
```



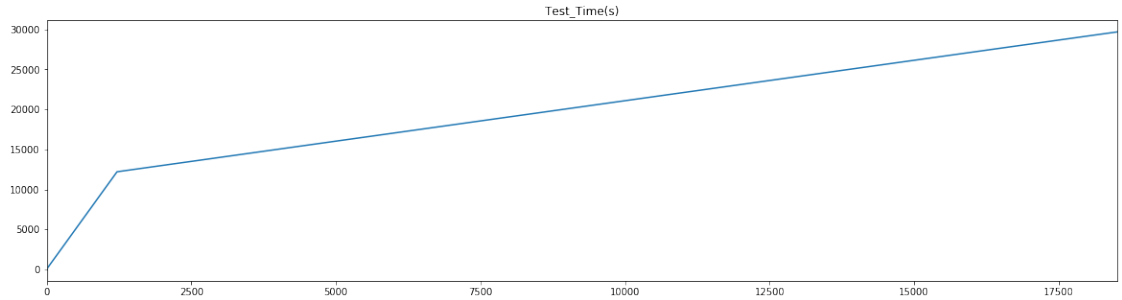

```
In [6]: df['Cycle_Index'].plot(title='Cycle_Index' , figsize=(20, 5))
```

```
Out[6]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e2676e590>
```



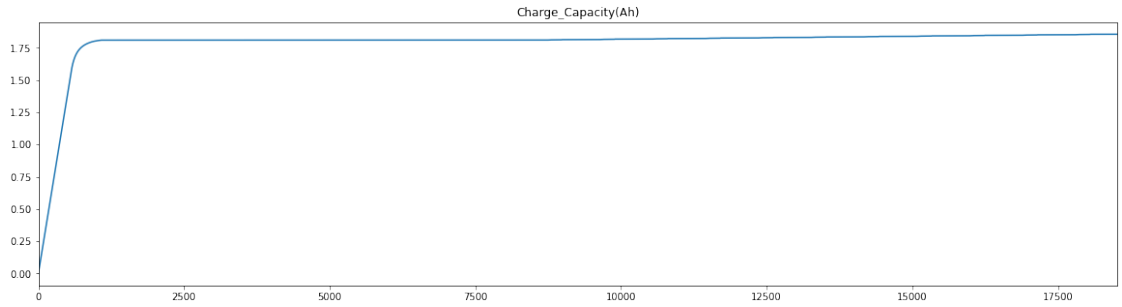

```
In [7]: df['Test_Time(s)'].plot(title='Test_Time(s)' , figsize=(20, 5))
```

```
Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e26648350>
```



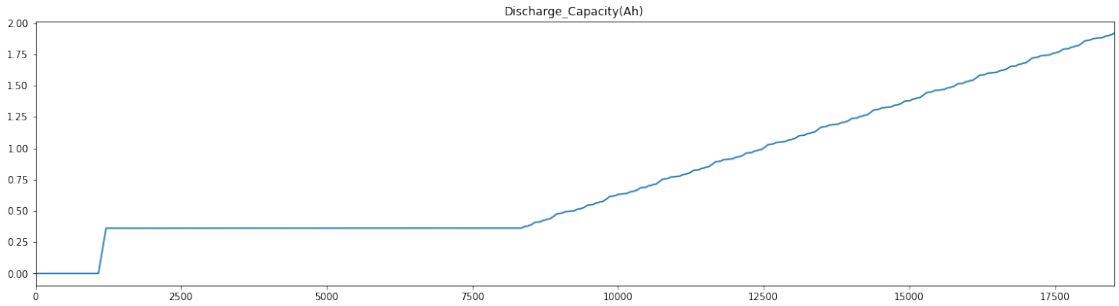

```
In [8]: df['Charge_Capacity(Ah)'].plot(title='Charge_Capacity(Ah)' , figsize=(20, 5))
```

```
Out[8]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e265dd690>
```



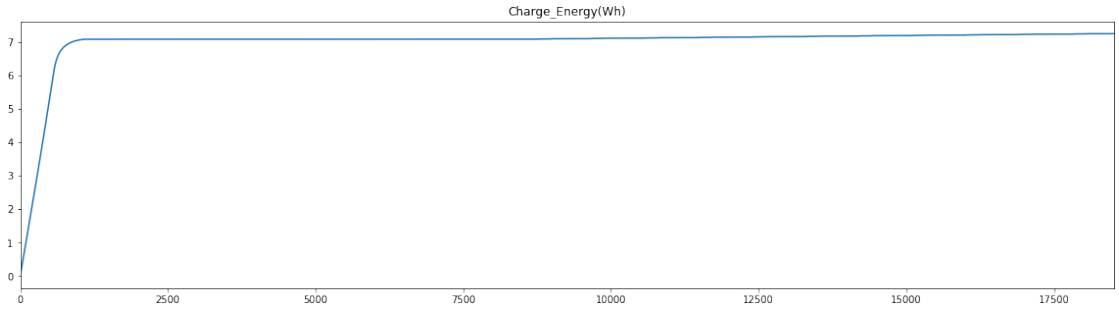

```
In [9]: df['Discharge_Capacity(Ah)'].plot(title='Discharge_Capacity(Ah)' , figsize=(20, 5))
```

```
Out[9]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e265dd9d0>
```



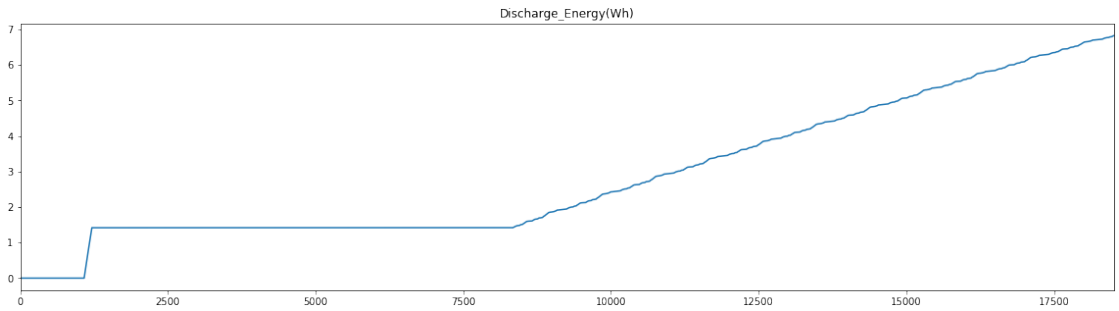

```
In [10]: df['Charge_Energy(Wh)'].plot(title='Charge_Energy(Wh)' , figsize=(20, 5))
```

```
Out[10]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e26522c50>
```




```
In [11]: df['Discharge_Energy(Wh)'].plot(title='Discharge_Energy(Wh)' , figsize=(20, 5))
```

```
Out[11]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e264bcd10>
```




```
In [12]: current = df['Current(A)']
         voltage = df['Voltage(V)']
```

```
import numpy as np

df_soc = df[['Current(A)','Voltage(V)']]

# df_soc['SOC'] = pd.Series([soc_init], index=df.index)
df_soc = df_soc.assign(SOC=pd.Series(np.ones(len(df.index))).values)

df_soc
```

Out[12]:

	Current(A)	Voltage(V)	SOC
0	0.000000	3.467053	1.0
1	0.999893	3.634876	1.0
2	0.999533	3.640546	1.0
3	0.999533	3.644434	1.0
4	0.999713	3.647350	1.0
5	0.999893	3.649617	1.0
6	0.999893	3.651237	1.0
7	0.999533	3.652695	1.0
8	0.999713	3.653667	1.0
9	0.999713	3.654801	1.0
10	0.999893	3.655611	1.0
11	0.999713	3.656421	1.0
12	0.999713	3.657069	1.0
13	0.999893	3.658041	1.0
14	0.999713	3.658851	1.0
15	0.999533	3.659661	1.0
16	0.999713	3.660471	1.0
17	0.999713	3.661281	1.0
18	0.999713	3.662253	1.0
19	0.999533	3.663063	1.0
20	0.999713	3.664197	1.0
21	0.999713	3.665331	1.0
22	0.999533	3.666303	1.0
23	0.999893	3.667437	1.0
24	0.999893	3.668571	1.0
25	0.999713	3.669543	1.0
26	0.999893	3.670838	1.0
27	0.999713	3.671810	1.0
28	0.999713	3.673106	1.0
29	0.999893	3.674240	1.0
...	...	...	...
18483	-1.667466	2.859422	1.0
18484	-1.667466	2.793168	1.0
18485	-1.667466	2.743437	1.0
18486	-1.667646	2.701157	1.0
18487	-1.667466	2.665681	1.0
18488	-1.389268	2.677668	1.0

```
18489   -1.389447    2.658553  1.0
18490   -1.389447    2.639276  1.0
18491   -1.389268    2.619675  1.0
18492   -1.389268    2.601208  1.0
18493   -1.389088    2.582579  1.0
18494   -1.389268    2.564922  1.0
18495   -1.389088    2.547265  1.0
18496   -1.389268    2.529932  1.0
18497   -1.389447    2.513408  1.0
18498   -0.556471    2.661631  1.0
18499   -0.556651    2.699375  1.0
18500   -0.556651    2.726427  1.0
18501   -0.556471    2.746676  1.0
18502   -0.556471    2.762228  1.0
18503   -0.556651    2.775025  1.0
18504   -0.556831    2.785230  1.0
18505   -0.556651    2.793978  1.0
18506   -0.556651    2.800944  1.0
18507   -1.333124    2.725456  1.0
18508   -1.333304    2.633930  1.0
18509   -1.333304    2.574317  1.0
18510   -1.333304    2.534953  1.0
18511   -1.333124    2.505471  1.0
18512   -1.333304    2.499963  1.0

[18513 rows x 3 columns]
```

In [13]:
```
# SOC calculation
for i in range(1, len(df_soc)):
    df_soc.loc[i, 'SOC'] = df_soc.loc[i-1, 'SOC'] + df_soc.loc[i-1, 'Current(A)']/7200

df_soc
```

Out[13]:

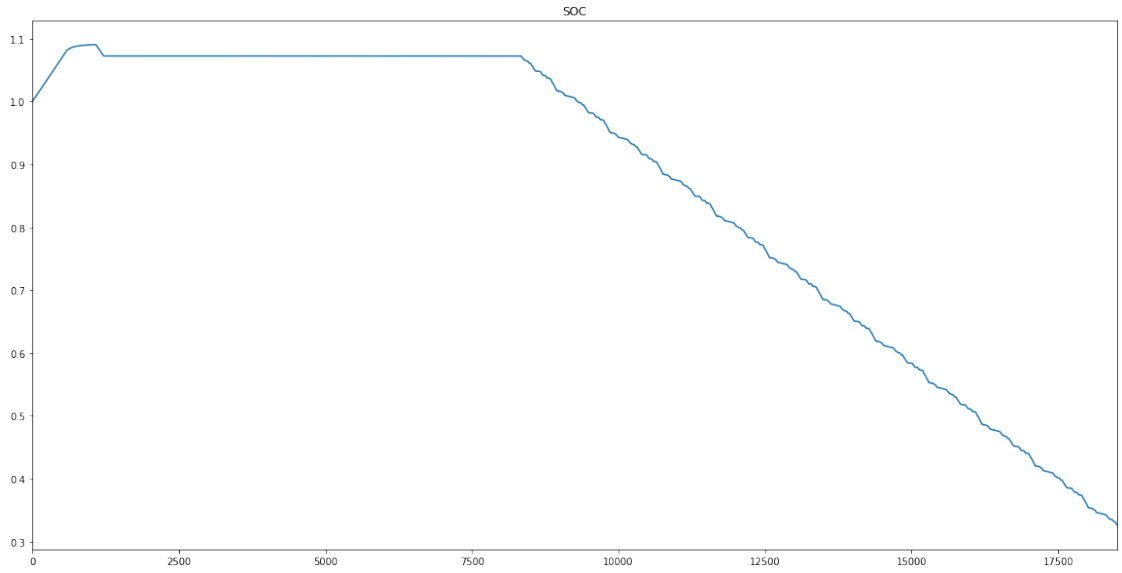
	Current(A)	Voltage(V)	SOC
0	0.000000	3.467053	1.000000
1	0.999893	3.634876	1.000000
2	0.999533	3.640546	1.000139
3	0.999533	3.644434	1.000278
4	0.999713	3.647350	1.000417
5	0.999893	3.649617	1.000555
6	0.999893	3.651237	1.000694
7	0.999533	3.652695	1.000833
8	0.999713	3.653667	1.000972
9	0.999713	3.654801	1.001111
10	0.999893	3.655611	1.001250
11	0.999713	3.656421	1.001389
12	0.999713	3.657069	1.001527
13	0.999893	3.658041	1.001666

14	0.999713	3.658851	1.001805
15	0.999533	3.659661	1.001944
16	0.999713	3.660471	1.002083
17	0.999713	3.661281	1.002222
18	0.999713	3.662253	1.002360
19	0.999533	3.663063	1.002499
20	0.999713	3.664197	1.002638
21	0.999713	3.665331	1.002777
22	0.999533	3.666303	1.002916
23	0.999893	3.667437	1.003055
24	0.999893	3.668571	1.003194
25	0.999713	3.669543	1.003332
26	0.999893	3.670838	1.003471
27	0.999713	3.671810	1.003610
28	0.999713	3.673106	1.003749
29	0.999893	3.674240	1.003888
...	...	...	...
18483	-1.667466	2.859422	0.330164
18484	-1.667466	2.793168	0.329932
18485	-1.667466	2.743437	0.329701
18486	-1.667646	2.701157	0.329469
18487	-1.667466	2.665681	0.329237
18488	-1.389268	2.677668	0.329006
18489	-1.389447	2.658553	0.328813
18490	-1.389447	2.639276	0.328620
18491	-1.389268	2.619675	0.328427
18492	-1.389268	2.601208	0.328234
18493	-1.389088	2.582579	0.328041
18494	-1.389268	2.564922	0.327848
18495	-1.389088	2.547265	0.327655
18496	-1.389268	2.529932	0.327462
18497	-1.389447	2.513408	0.327269
18498	-0.556471	2.661631	0.327076
18499	-0.556651	2.699375	0.326999
18500	-0.556651	2.726427	0.326922
18501	-0.556471	2.746676	0.326844
18502	-0.556471	2.762228	0.326767
18503	-0.556651	2.775025	0.326690
18504	-0.556831	2.785230	0.326612
18505	-0.556651	2.793978	0.326535
18506	-0.556651	2.800944	0.326458
18507	-1.333124	2.725456	0.326381
18508	-1.333304	2.633930	0.326195
18509	-1.333304	2.574317	0.326010
18510	-1.333304	2.534953	0.325825
18511	-1.333124	2.505471	0.325640
18512	-1.333304	2.499963	0.325455

```
[18513 rows x 3 columns]
```

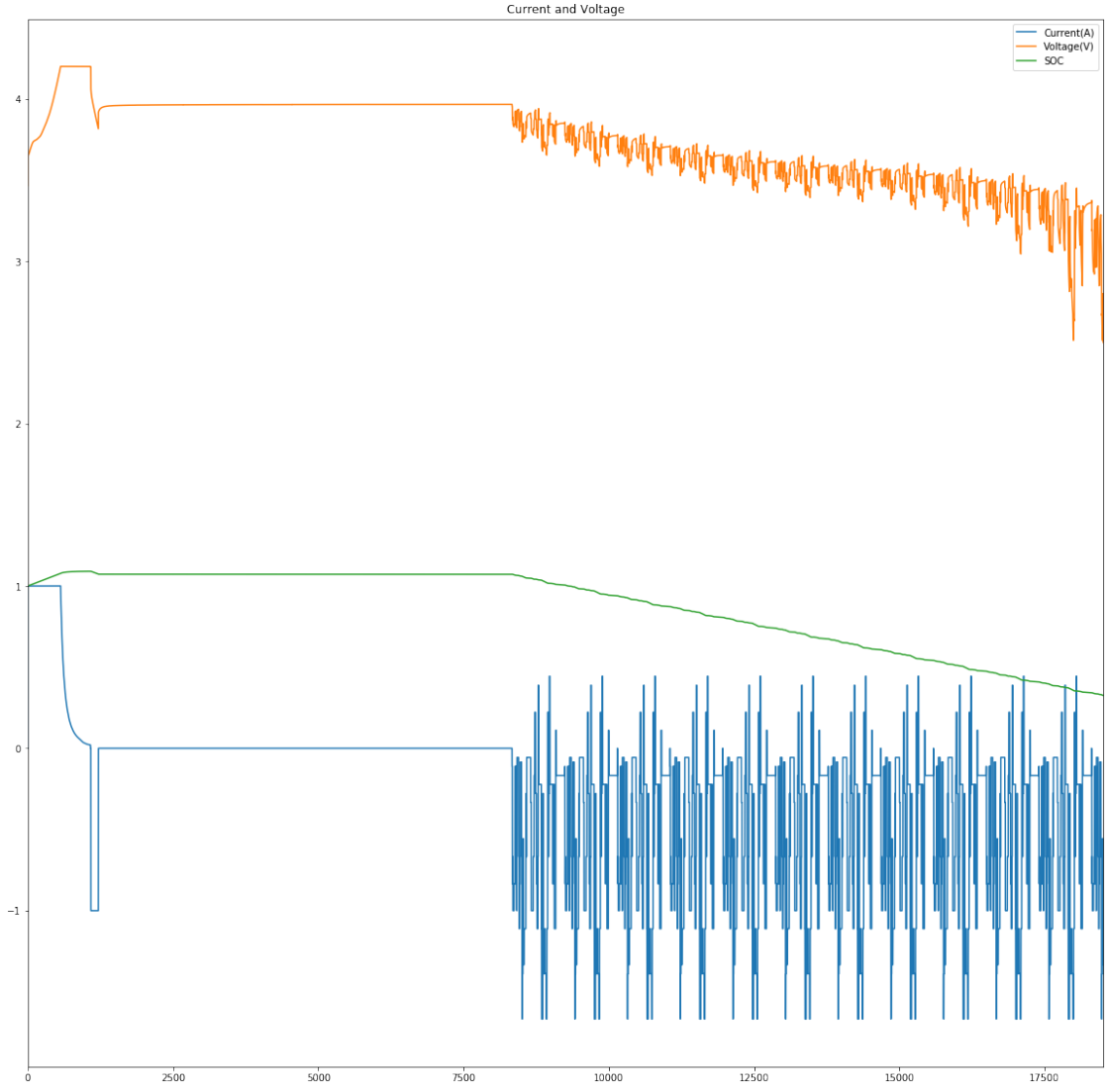
```
In [14]: df_soc['SOC'].plot(title='SOC' , figsize=(20, 10))
```

```
Out[14]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e264f5a10>
```




```
In [15]: df_soc.plot(title='Current and Voltage' , figsize=(20, 20))
```

```
Out[15]: <matplotlib.axes._subplots.AxesSubplot at 0x7f6e26281fd0>
```


Current and Voltage
Current(A)
Voltage(V)
SOC
4
3
2
1
0
−1
0
2500
5000
7500
10000
12500
15000
17500