In [59]:
```
import pandas as pd
import numpy as np
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline
```

In [60]:
```
names = [
    't',
    'q1', 'q2', 'q3',
    'dq1', 'dq2', 'dq3',
    'I1', 'I2', 'I3',
    'eps21', 'eps22', 'eps31', 'eps32',
    'ddq1', 'ddq2', 'ddq3'
]
df = pd.read_csv('https://raw.githubusercontent.com/sdrangan/introml/2
                 header=None,names=names,index_col=0)
```

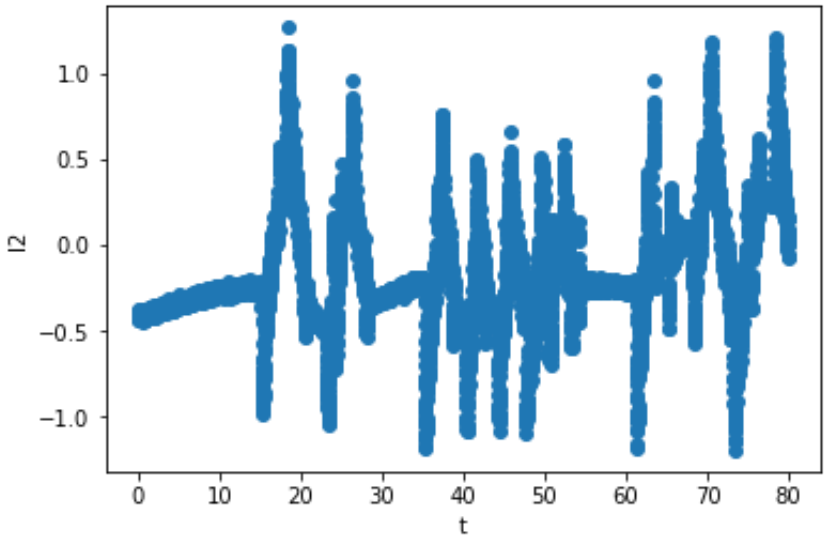
In [61]:
```
df.head(6)
```

Out[61]:

t	q1	q2	q3	dq1	dq2	dq3	I1	I2	I3
0.00	-0.000007	2.4958	-1.1345	-7.882100e-21	-4.940656e-321	3.913100e-29	-0.081623	-0.40812	-0
0.01	-0.000007	2.4958	-1.1345	-2.258200e-21	-4.940656e-321	2.626200e-31	-0.037411	-0.37241	-0
0.02	-0.000007	2.4958	-1.1345	-6.469800e-22	-4.940656e-321	1.762500e-33	-0.066319	-0.40302	-0
0.03	-0.000007	2.4958	-1.1345	-1.853600e-22	-4.940656e-321	1.182800e-35	-0.068020	-0.43703	-0
0.04	-0.000007	2.4958	-1.1345	-5.310600e-23	-4.940656e-321	-5.270900e-03	-0.052715	-0.40472	-0
0.05	-0.000007	2.4958	-1.1345	-1.521500e-23	-4.940656e-321	3.252600e-04	-0.088425	-0.42342	-0

In [62]:
```
y = df['I2']
t = df.index
plt.plot(t, y, 'o')
plt.xlabel('t')
plt.ylabel('I2')
```

Out[62]: <matplotlib.text.Text at 0x1196da2e8>



In [63]:
```
ytrain = np.array(df['I2'])
xtrain = np.array(df[['q2','dq2','eps21', 'eps22', 'eps31', 'eps32', '
```

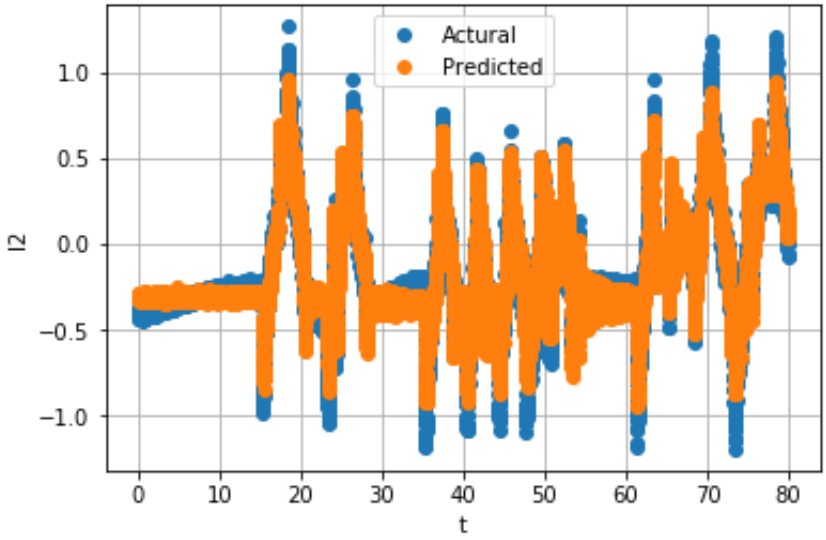
In [64]:
```
from sklearn import linear_model

#Creat linear regression object
regr = linear_model.LinearRegression()
```

In [65]:
```
regr.fit(xtrain, ytrain)
```

Out[65]:
```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=1, normaliz
e=False)
```

In [66]:
```
y_tr_pred = regr.predict(xtrain)
plt.plot(t, ytrain, 'o')
plt.plot(t, y_tr_pred, 'o')
plt.grid()
plt.legend(['Actural', 'Predicted'])
plt.xlabel('t')
plt.ylabel('I2')
```

Out[66]: <matplotlib.text.Text at 0x119ebbc88>

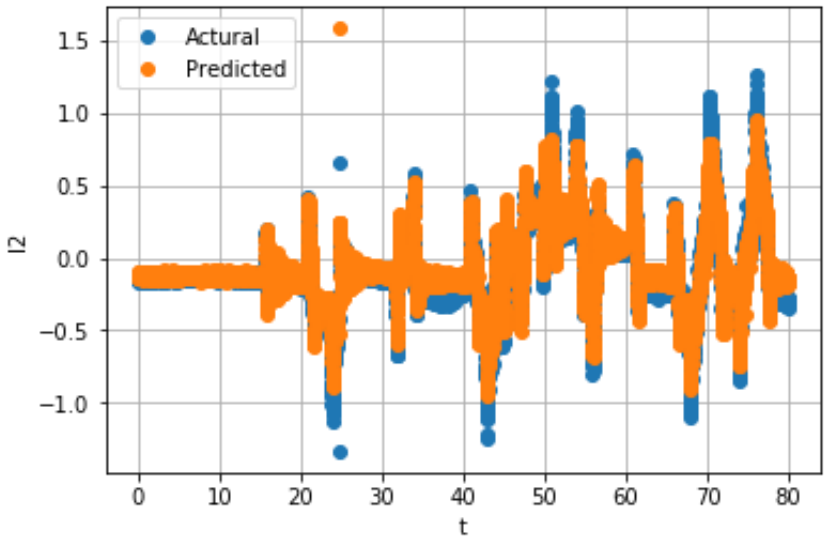


In [67]:
```
RSS_train = np.mean((y_tr_pred-ytrain)**2)/(np.std(ytrain)**2)
print("Normalized RSS = {0:f}".format(RSS_train))
```

```
Normalized RSS = 0.095833
```

In [68]:
```
df_test = pd.read_csv('https://raw.githubusercontent.com/sdrangan/intr
                      header=None, names=names, index_col=0)
y_test = np.array(df_test['I2'])
x_test = np.array(df_test[['q2','dq2','eps21', 'eps22', 'eps31', 'eps3
y_test_pred = regr.predict(x_test)
plt.plot(t, y_test, 'o')
plt.plot(t, y_test_pred, 'o')
plt.grid()
plt.legend(['Actural', 'Predicted'])
plt.xlabel('t')
plt.ylabel('I2')
```

Out[68]: <matplotlib.text.Text at 0x11979ea20>



In [69]:
```
RSS_test = np.mean((y_test_pred-y_test)**2)/(np.std(y_test)**2)
print("Normalized RSS of test data = {0:f}".format(RSS_test))
```

```
Normalized RSS of test data = 0.126780
```

In [ ]: