In [66]:
```python
import math
import numpy as np;
import matplotlib.pyplot as plt
from math import atan2
```

In [16]:
```python
m = np.array([[0, 1j], [1, 1+1j]])
print(m)
```

```
[[0.+0.j 0.+1.j]
 [1.+0.j 1.+1.j]]
```

In [13]:
```python
Zl1 = 1j*314*25*10**-3
Zl2 = 1j*314*95*10**-3
Zc2 = 1/(1j*314*159*10**-6)
```

In [8]:
```python
print(Zl1)
```

```
7.8500000000000005j
```

In [25]:
```python
Z1 = 6 + Zl1
Z2 = 20 + Zl2
Z3 = Zc2
print(Z1)
```

```
(6+7.8500000000000005j)
```

In [27]:
```python
X = np.array([
        [1, -1, -1]
    , [Z1, 0, Z3]
    , [0, Z2, -Z3]
])

A = np.array([
        [0]
    , [150]
    , [0]
])
res = numpy.linalg.solve(X, A)
print(numpy.linalg.solve(X, A))
```

```
[[3.71242662+3.36596752j]
 [1.24915995-4.33003977j]
 [2.46326667+7.6960073j ]]
```

In [45]:
```python
print("Z1 =", abs(Z1), "e**i", atan2(Z1.imag, Z1.real)*57,2958)
print("Z2 =", abs(Z2), "e**i", atan2(Z2.imag, Z2.real)*57,2958)
print("Z3 =", abs(Z3), "e**i", atan2(Z3.imag, Z3.real)*57,2958)

print("\nI1 =", abs(res[0]), "e**i", atan2(res[0].imag, res[0].real)*57,29
print("I2 =", abs(res[1]), "e**i", atan2(res[1].imag, res[1].real)*57,2958
print("I3 =", abs(res[2]), "e**i", atan2(res[2].imag, res[2].real)*57,2958

U1 = Z1*res[0]
U2 = Z2*res[1]
U3 = Z3*res[2]

print("\nU1 =", abs(U1), "e**i", atan2(U1.imag, U1.real)*57,2958)
print("U2 =", abs(U2), "e**i", atan2(U2.imag, U2.real)*57,2958)
print("U3 =", abs(U3), "e**i", atan2(U3.imag, U3.real)*57,2958)
```

```
Z1 = 9.880409910524968 e**i 52.33661101799312 2958
Z2 = 35.91418800418575 e**i 55.86957850231222 2958
Z3 = 20.02964387293194 e**i -89.5353906273091 2958

I1 = [5.01117239] e**i 41.97999796525505 2958
I2 = [4.50662235] e**i -73.52630334118923 2958
I3 = [8.08060709] e**i 71.87866578843209 2958

U1 = [49.51243738] e**i 94.31660898324817 2958
U2 = [161.85168231] e**i -17.65672483887701 2958
U3 = [161.85168231] e**i -17.656724838877015 2958
```
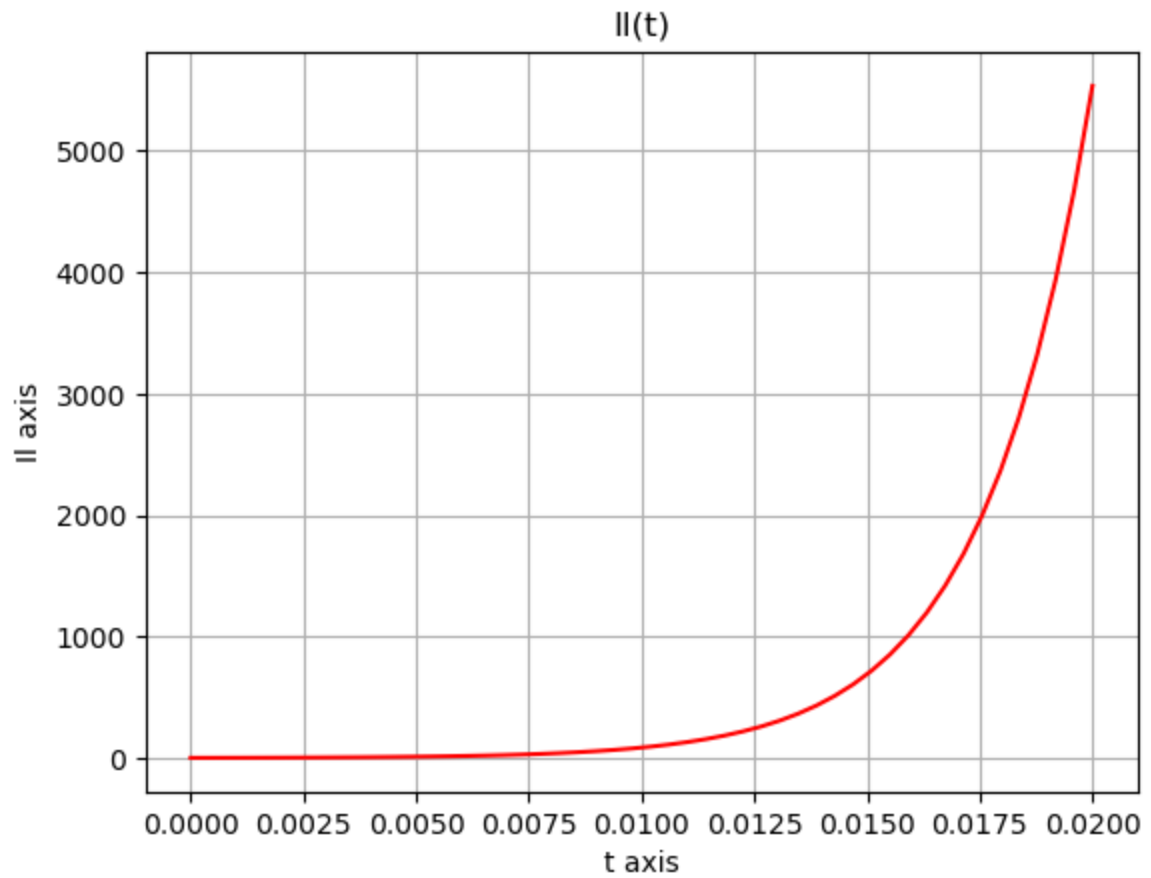
In [65]:
```python
Sract = (abs(res[0])**2)*Zl1 + (abs(res[1])**2)*Zl2 + (abs(res[2])**2)*Zc2
Sact = (abs(res[0])**2)*6 + (abs(res[1])**2)*20
Ssource = res[0] * 150
print(Sact + Sract, Ssource)
```

```
[556.86399251-504.8951287j] [556.86399251+504.8951287j]
```
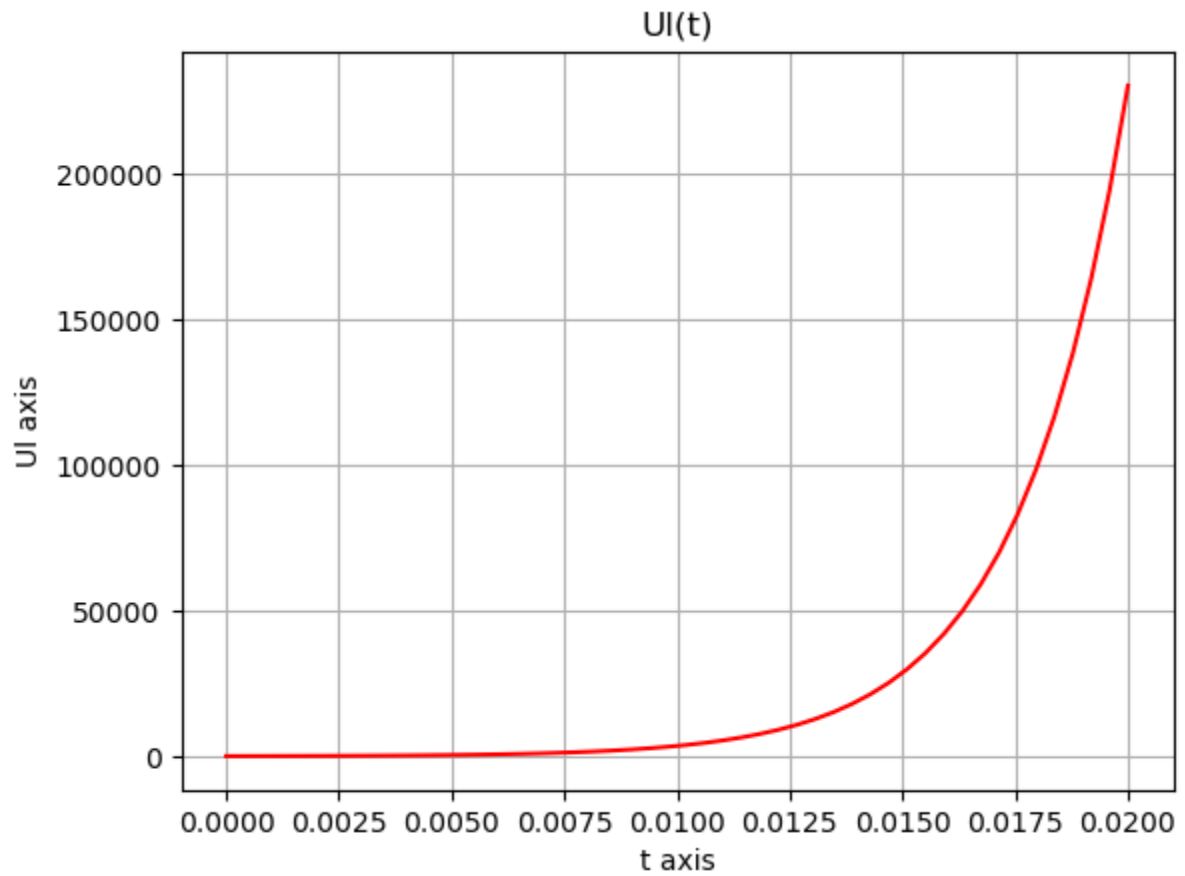
```
In [105]: x = np.linspace(0, 0.02)
          y = 1 + 1.33 * np.exp(416.66*x)

          plt.title("Il(t)")
          plt.xlabel("t axis")
          plt.ylabel("Il axis")
          plt.plot(x, y, color ="red")
          plt.grid()
          plt.show()
```
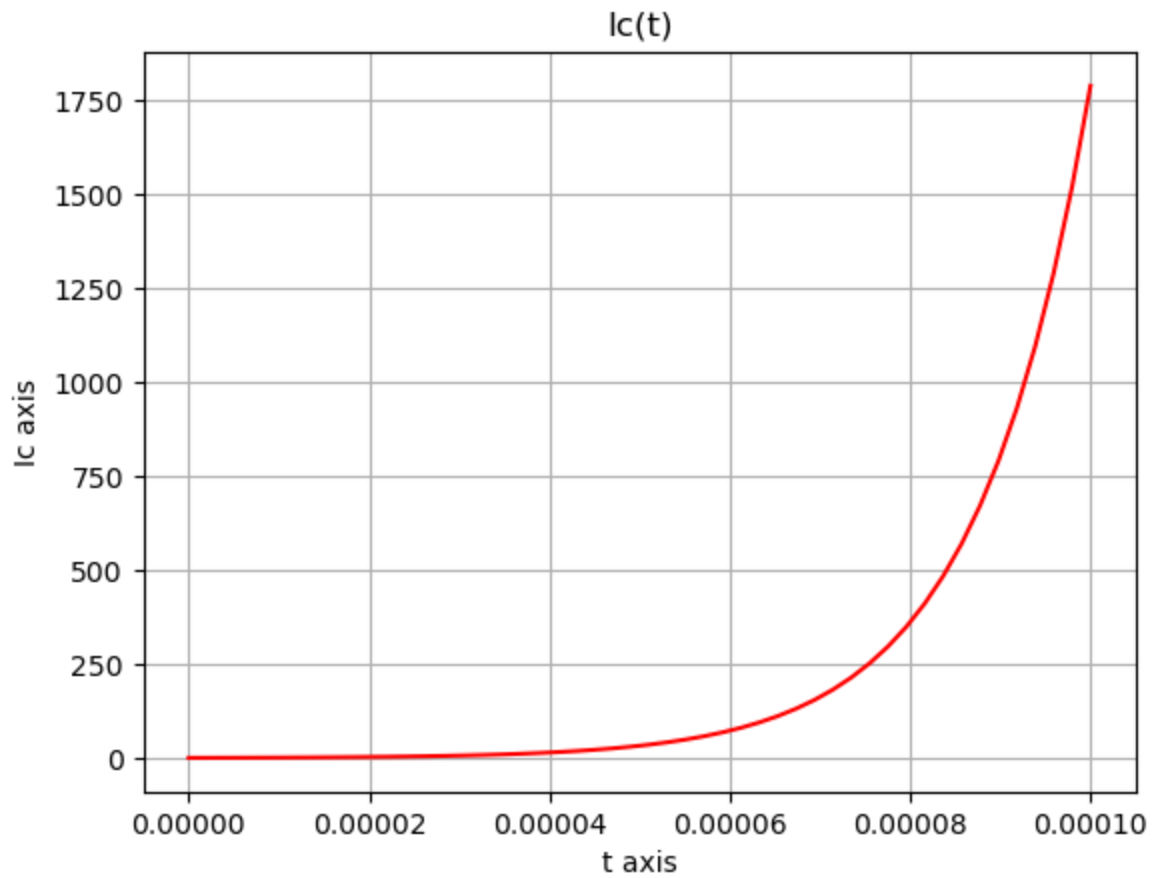
In [103]:
```python
x = np.linspace(0, 0.02)
y = 55.41 * np.exp(416.66*x)

plt.title("Ul(t)")
plt.xlabel("t axis")
plt.ylabel("Ul axis")
plt.plot(x, y, color ="red")
plt.grid()
plt.show()
```
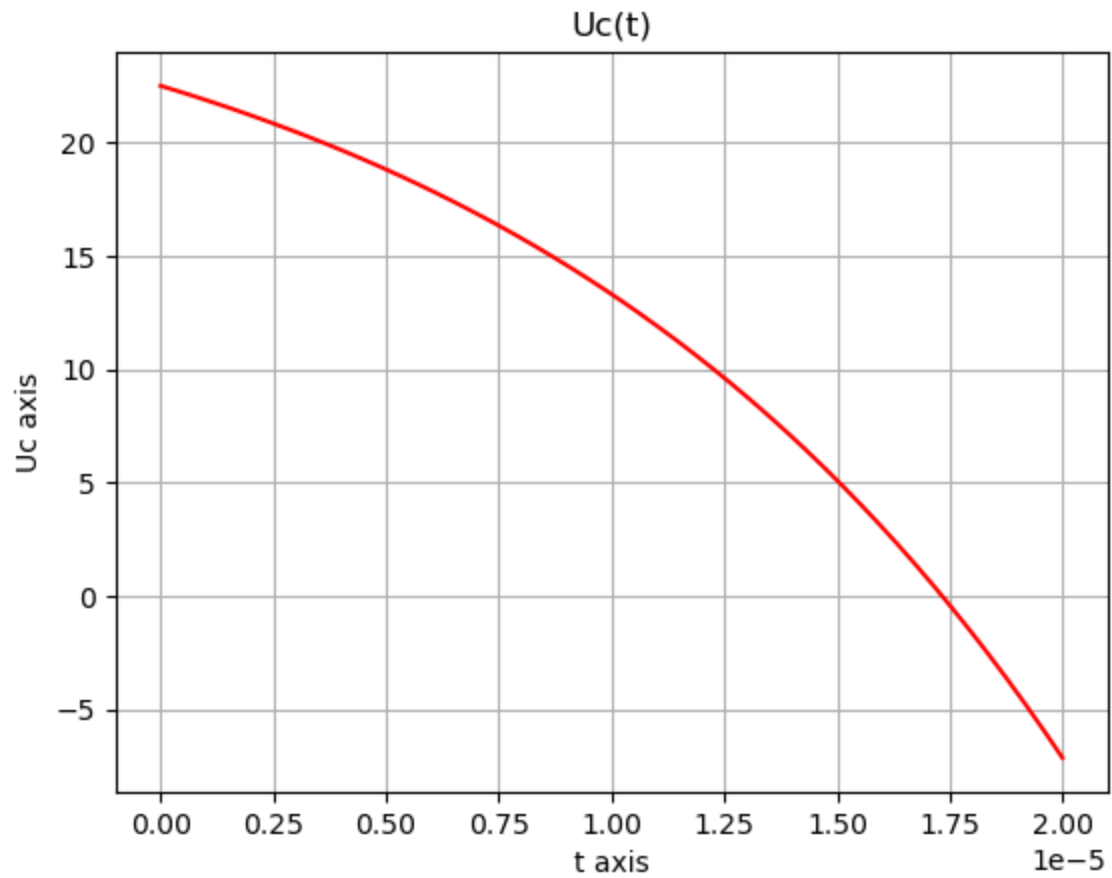
In [90]:
```python
x = np.linspace(0, 0.0001)
y = 0.6 * np.exp(8*(10**4)*x)

plt.title("Ic(t)")
plt.xlabel("t axis")
plt.ylabel("Ic axis")
plt.plot(x, y, color ="red")
plt.grid()
plt.show()
```

In [98]:
```python
x = np.linspace(0, 0.00002)
y = 30 - 7.5 * np.exp(8*(10**4)*x)

plt.title("Uc(t)")
plt.xlabel("t axis")
plt.ylabel("Uc axis")
plt.plot(x, y, color ="red")
plt.grid()
plt.show()
```


In [ ]: