Idigcap

November 10, 2024

[1]:

```
import skrf
import numpy as np
from matplotlib import pyplot as plt
%matplotlib inline

import warnings
import glob

warnings.filterwarnings("ignore", category=RuntimeWarning)

plt.rcParams["figure.figsize"] = [12,10]
```

[2]:

```
# calculate C series from ABCD

#  P1p --- capacitor ---- P2p
#
#  P1n ------------------ P2n

# ABCD = (A_00 A_01)
#        (A_10 A_11)

def calculate_series_capacitance(n):
    C = np.imag( 1 / net.a[:,0,1] ) / (2*np.pi*net.f)
    return net.f, C
```

1 Interdigital Cap C2

- fingers = 6
- symmetrical simulation

[3]:

```
net = skrf.Network("idigcap_C2_res_0.75_sp.s2p")
```

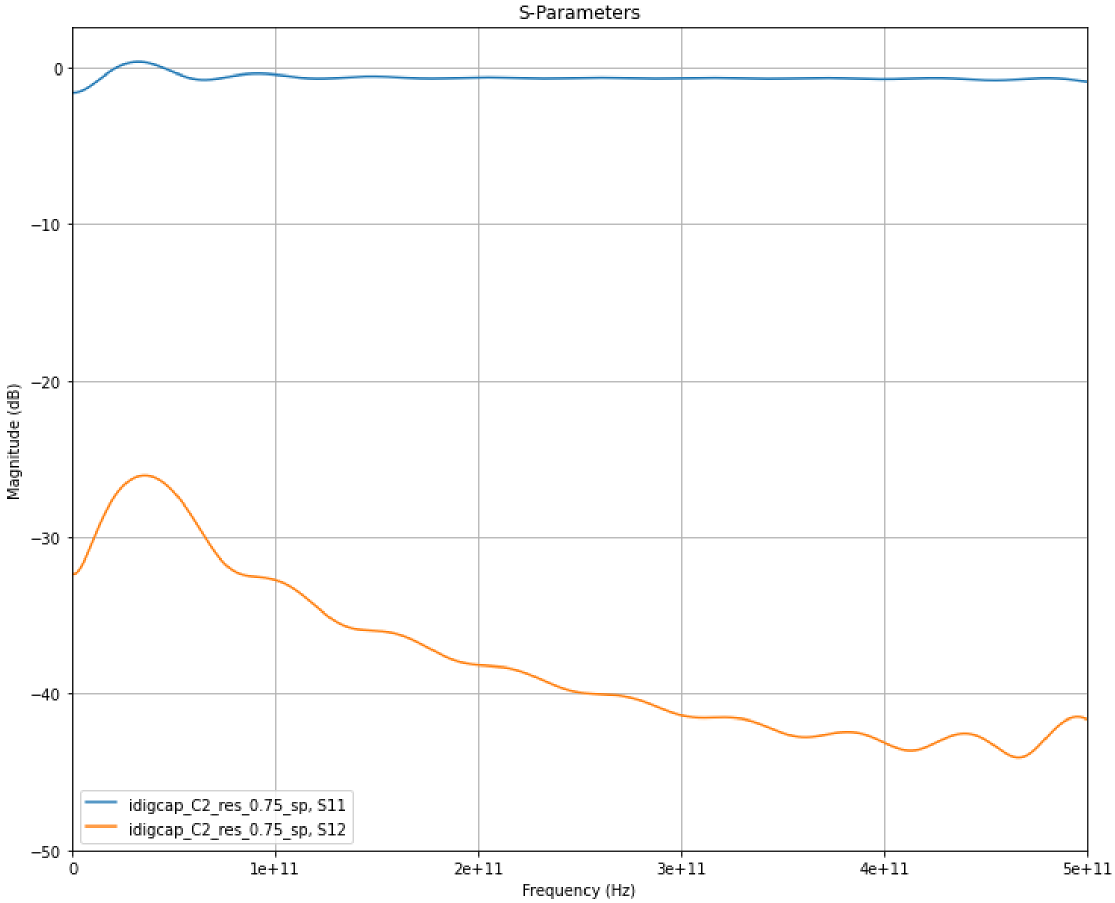
[4]:

```
print(net)
```

```
2-Port Network: 'idigcap_C2_res_0.75_sp',  0.0-500000000000.0 Hz, 20000 pts,
z0=[50.+0.j 50.+0.j]
```

[5]:

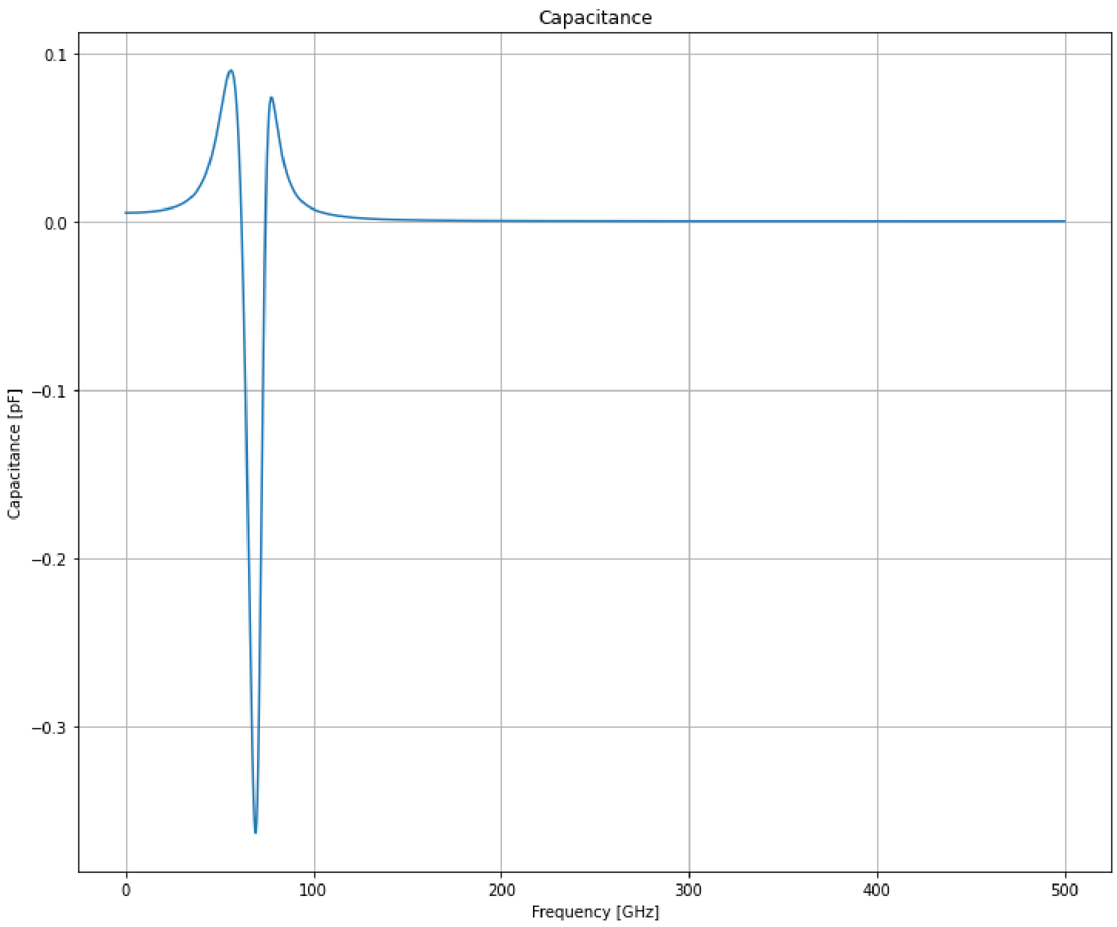
```
net.plot_s_db(m=0)
plt.grid()
plt.ylim(bottom=-50)
plt.title("S-Parameters")
plt.show()
```



[6]:

```
f, C = calculate_series_capacitance(net)

plt.title("Capacitance")
plt.xlabel("Frequency [GHz]")
plt.ylabel("Capacitance [pF]")
plt.grid()
_ = plt.plot(f/1e9, C*1e12)
```



2 Interdigital Cap C3

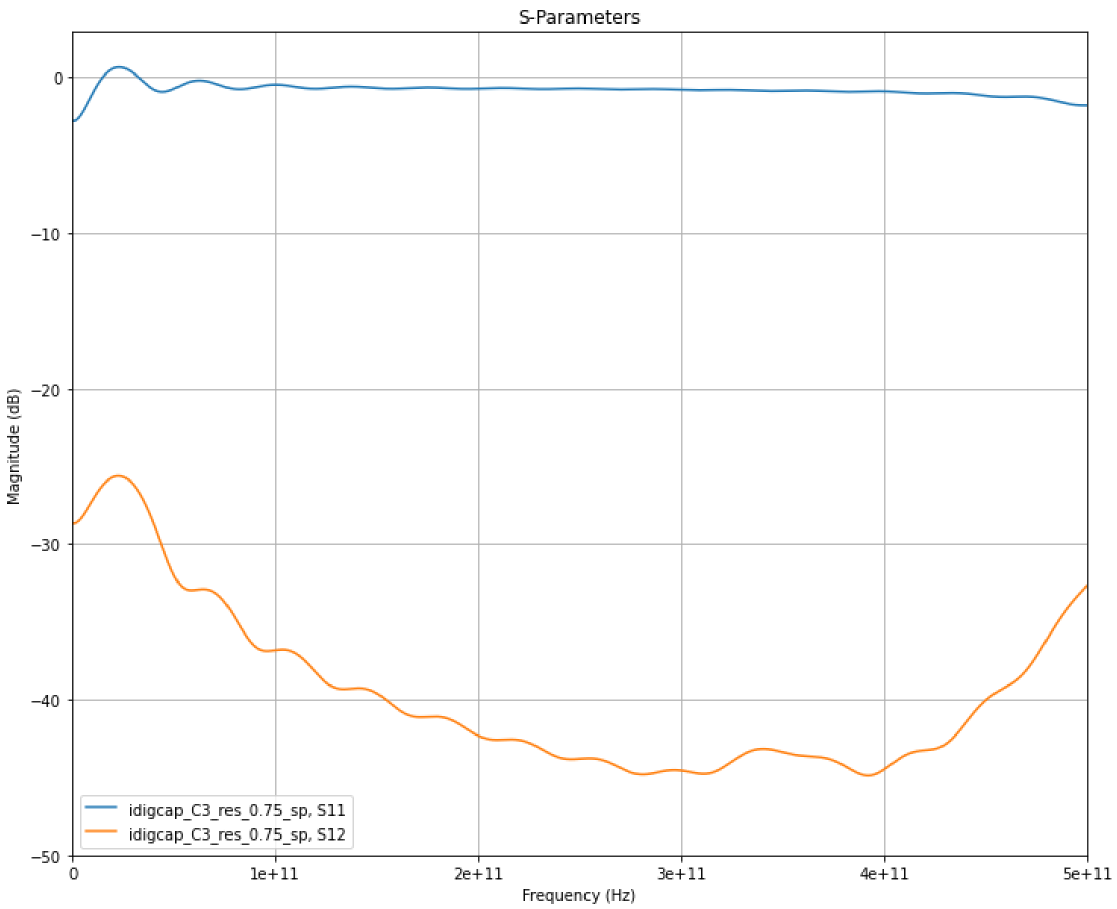
- fingers = 12
- symmetrical simulation

[7]:
```
net = skrf.Network("idigcap_C3_res_0.75_sp.s2p")
```

[8]:
```
print(net)
```

```
2-Port Network: 'idigcap_C3_res_0.75_sp',  0.0-500000000000.0 Hz, 20000 pts,
z0=[50.+0.j 50.+0.j]
```

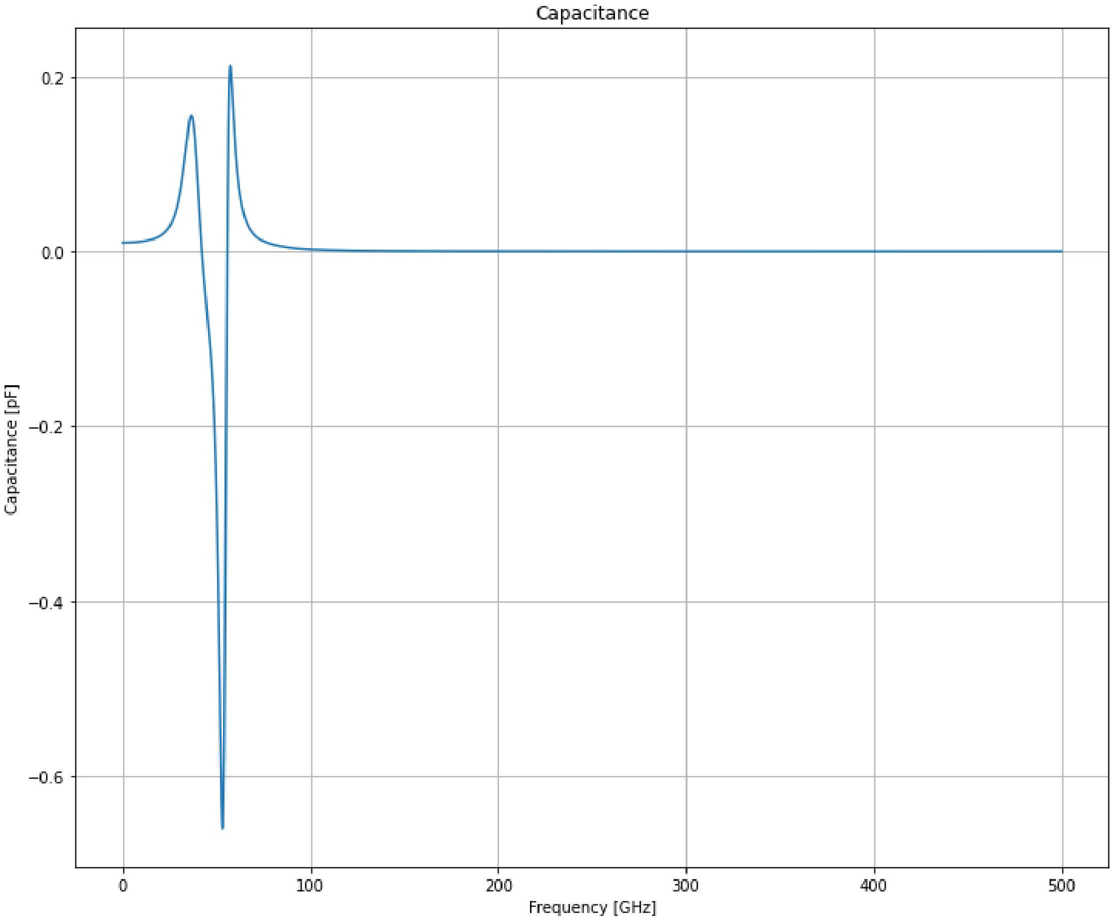
[9]:
```
net.plot_s_db(m=0)
plt.grid()
plt.ylim(bottom=-50)
plt.title("S-Parameters")
plt.show()
```



[10]:

```
f, C = calculate_series_capacitance(net)

plt.title("Capacitance")
plt.xlabel("Frequency [GHz]")
plt.ylabel("Capacitance [pF]")
plt.grid()
_ = plt.plot(f/1e9, C*1e12)
```


Capacitance
Capacitance [pF]
0.2
0.0
−0.2
−0.4
−0.6
0
100
200
300
400
500
Frequency [GHz]