In [1]:

```
# задерж сопр ~= 4В
import pandas as pd

meas = [
    (0, 0),
    (4.36, 5),
    (7.24, 9),
    (10.02, 13.5),
    (12.52, 17),
    (15.06, 20.5),
    (17.92, 24),
    (20.32, 24),
    (19.45, 24.5),
    (22.09, 18.5),
    (22.28, 17),
    (22.58, 15),
    (23.50, 14),
    (26.52, 19),
    (28.17, 23),
    (30.39, 28),
    (32.05, 32),
    (34.20, 37),
    (38.45, 40),
    (40.14, 38),
    (41.90, 35),
    (44.47, 34),
    (49.44, 37),
    (52.08, 40),
    (55.48, 45),
    (59.62, 50),
    (73.37, 55),
    (77.24, 57),
    (77.23, 58),
    (70.75, 54),
    (73, 55),
    (74.48, 56),
    (75.6, 57),
    (76.91, 58),
    (77.6, 59),
    (81.3, 62),
]
```

In [2]:

```
len(meas)
```

Out[2]:

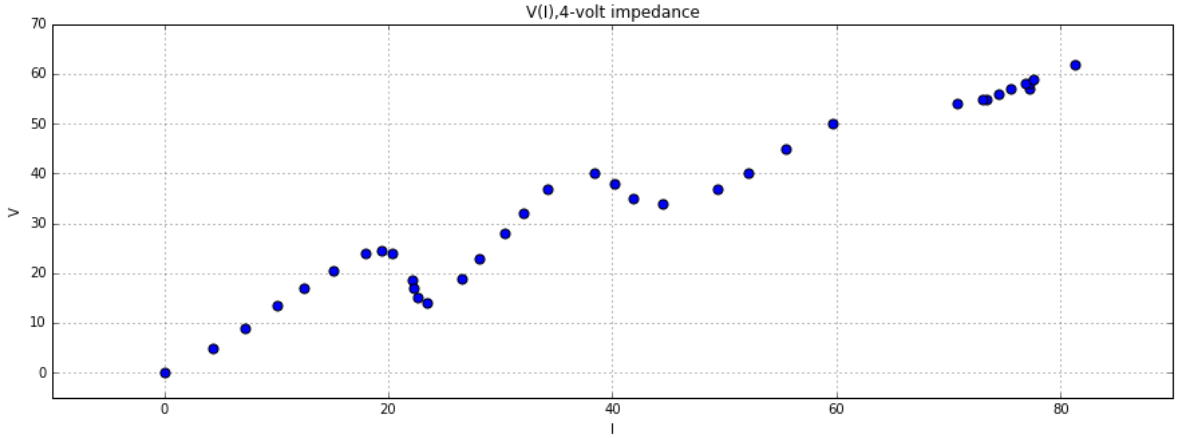
36

In [3]:

```
import numpy as np
import matplotlib.pyplot as plt
#plt.style.use('fivethirtyeight')
```

In [12]:

```
plt.figure(figsize=(15, 5))
plt.scatter([x[0] for x in meas], [x[1] for x in meas],s=50)
plt.title('V(I),4-volt impedance')
plt.xlabel('I')
plt.grid()
plt.ylabel('V')
plt.ylim(-5,70)
plt.show()
```



In [5]:

```
# задерж сопр ~= 6В

meas2 = [
    (0.05, 0),
    (5.87, 5),
    (9.11, 10),
    (12.62, 15),
    (16.3, 20),
    (19.35, 23.5),
    (22.35, 20),
    (24.33, 17),
    (26.34, 8.5),
    (27.24, 11),
    (28.3, 14),
    (30.56, 20),
    (34.11, 29),
    (35.44, 32),
    (36.37, 33.5),
    (39.5, 33),
    (43.05, 27),
    (44.95, 25),
    (46.53, 24.5),
    (55.03, 31),
    (63.73, 37.5),
    (71.29, 37),
    (77.35, 39),
    (78, 40),
    (81.32, 42),
    (4.97, 4),
    (9.09, 10),
    (11.6, 14),
    (13.22, 17),
    (14.48, 19),
    (16.14, 21),
    (18.11, 24),
    (19.26, 25),
    (21.82, 23),
    (23.37, 9),
    (24.64, 7),
    (27.35, 12),
    (30, 20),
    (33.04, 28),
    (34.82, 32),
    (36.44, 35),
    (40.22, 33),
    (42.28, 29),
    (43.72, 27.5),
    (45.15, 26),
    (47.51, 25),
    (52.87, 29.5),
    (59.27, 37),
    (63.92, 38.5),
    (70.54, 38),
    (76.9, 40),
    (81.28, 43),
    (32.07, 26),
    (33.54, 29),
    (35.22, 33),
    (37.00, 35),
```

```
    (38.29, 34.8),

    (39.45, 34),
    (40.78, 31.5),
    (20.89, 24),
    (22.09, 22),
    (24.45, 7.5),
    (25.76, 8),
    (26.69, 10),
    (26.9, 10.5),
    (27.26, 11.8),
    (28.02, 14),
    (29.80, 19),
    (23.19, 10),
    (24.66, 7.1),
    (22.68, 13),
    (21.03, 23),
    (22.04, 22),
    (21.33, 23),
    (28.38, 15),
    (29.22, 17.5),
    (29.01, 17),
    (30.87, 22),
    (55.46, 32.9),
    (54.03, 31),
    (56.86, 34.9),
    (57.34, 35.1),
    (51.81, 28),
    (53.44, 30),
    (54.8, 31.8),
    (55.95, 33.1),
    (58.51, 36.1),
    (68.84, 37.5),
    (70.88, 37.8),
    (71.54, 37.9),
]
```

In [6]:

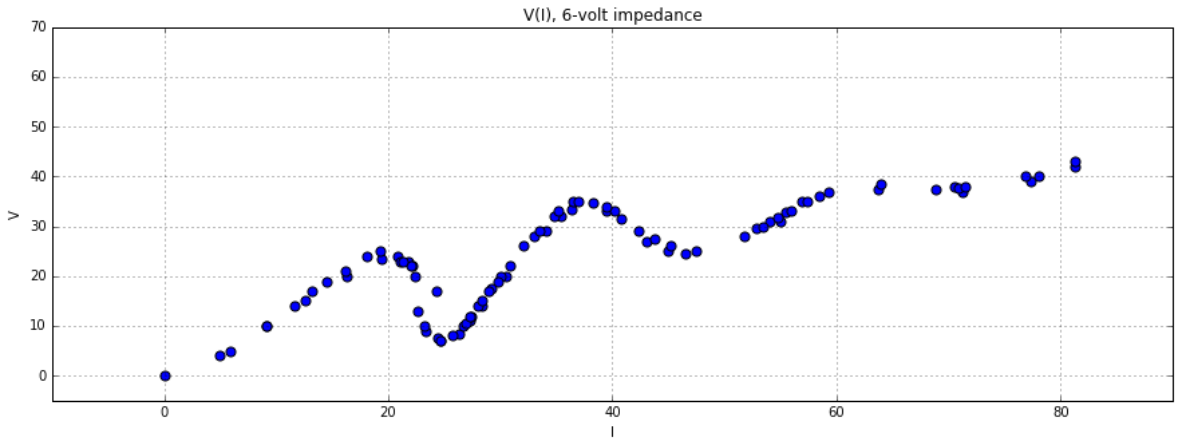
```
len(meas2)
```

Out[6]:

90

In [11]:

```
plt.figure(figsize=(15, 5))
plt.scatter([x[0] for x in meas2], [x[1] for x in meas2],s=50)
plt.title('V(I), 6-volt impedance')
plt.xlabel('I')
plt.grid()
plt.ylabel('V')
plt.ylim(-5,70)
plt.show()
```



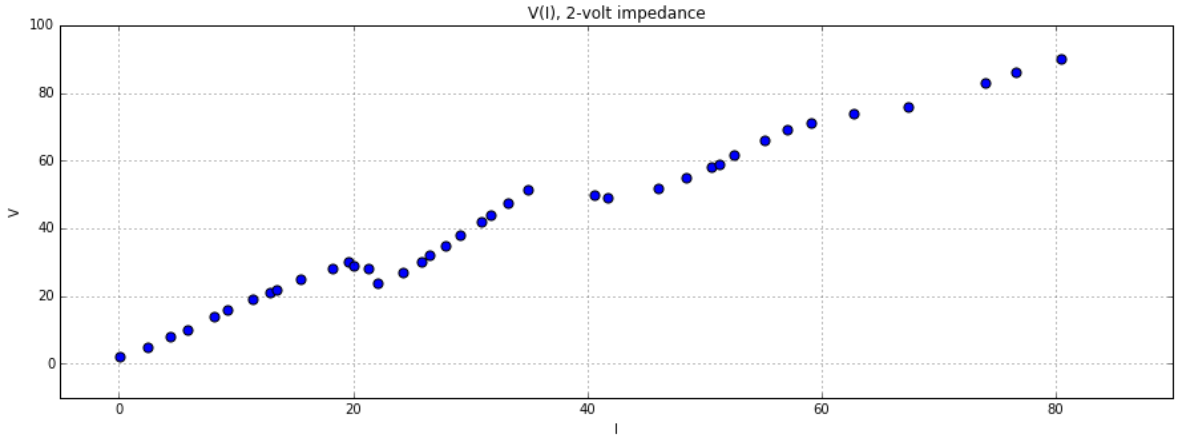
In [8]:

```
# задерж сопр ~= 2В


meas3 = [
    (0.05, 2),
    (2.43, 5),
    (4.42, 8),
    (5.9, 10),
    (8.18, 14),
    (9.28, 16),
    (11.47, 19),
    (12.87, 21),
    (13.48, 22),
    (15.55, 25),
    (18.18, 28),
    (19.54, 30),
    (20.06, 29),
    (21.32, 28),
    (22.10, 24),
    (24.22, 27),
    (25.85, 30),
    (26.54, 32),
    (27.9, 35),
    (29.16, 38),
    (30.89, 42),
    (31.78, 44),
    (33.16, 47.5),
    (34.93, 51.5),
    (40.56, 50),
    (41.73, 49),
    (46.05, 52),
    (48.39, 55),
    (50.56, 58),
    (51.22, 59),
    (52.54, 61.5),
    (55.08, 66),
    (57.01, 69),
    (59.09, 71),
    (62.69, 74),
    (67.41, 76),
    (73.98, 83),
    (76.53, 86),
    (80.39, 90)
]
```

In [10]:

```
plt.figure(figsize=(15, 5))
plt.scatter([x[0] for x in meas3], [x[1] for x in meas3],s=50)
plt.title('V(I), 2-volt impedance')
plt.xlabel('I')
plt.ylabel('V')
plt.xlim(-5,90)
plt.grid()
plt.ylim(-10, 100)
plt.show()
```



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