Computational Methods

Assignment 1

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Imports

```
import numpy as np
import matplotlib.pyplot as plt
```

Variables and Constants

For solving the equation system:

$$\begin{pmatrix} 6I_2 - 2I_3 & = 10 \\ 4I_2 + I_3 + 2I_4 + 2I_5 & = 17 \\ 2I_5 + 4I_6 & = 14 \\ I_1 - I_2 + I_4 & = 0 \\ I_3 - I_5 + I_6 & = 0 \\ I_4 - I_5 + I_6 & = 0 \end{pmatrix}$$

```
circuit = np.array(
    [
        [0, 6, -2, 0, 0, 0],
        [0, 4, 1, 2, 2, 0],
        [0, 0, 0, 0, 2, 4],
        [1, -1, 0, 1, 0, 0],
        [0, 0, 1, 0, -1, 1],
        [0, 0, 0, 1, -1, 1],
    ]
)
voltages = np.array([10, 100, 14, 0, 0, 0])
```

Solving the Equation System

```
currents = np.linalg.solve(circuit, voltages)
```

Currents are:

- $I_1 = -9$
- $I_2 = 7$

- $I_3 = 16$
- $I_4 = 16$
- $I_5 = 13$
- $I_6 = -3$