```
circuit = Circuit('circuits/thevenin.txt');
circuit.list
```

```
ans =
    'V1 1 0 DC 28
     V2 3 0 DC 7
     R1 1 2 4
     R2 2 0 2
     R3 2 3 1
     '
```

```
ELAB.analyze(circuit)
```

```
Symbolic analysis successful (0.340513 sec).
```

```
circuit.symbolic_node_voltages
```

```
ans =
```

$$\begin{pmatrix} v_1 = V_1 \\ v_2 = \dfrac{R_2\,(R_1\,V_2 + R_3\,V_1)}{R_1\,R_2 + R_1\,R_3 + R_2\,R_3} \\ v_3 = V_2 \end{pmatrix}$$

```
ELAB.evaluate(circuit)
```

```
Numerical evaluation successful (0.0430766 sec).
```

```
circuit.open(circuit.Resistors(2))
circuit.list
```

```
ans =
    'V1 1 0 DC 28
     V2 3 0 DC 7
     R1 1 2 4
     R3 2 3 1
     '
```

```
ELAB.evaluate(circuit)
```

```
Symbolic analysis successful (0.256226 sec).

Numerical evaluation successful (0.0625652 sec).
```

```
circuit.symbolic_node_voltages
```

```
ans =
```

$$\begin{pmatrix} v_1 = V_1 \\ v_2 = \dfrac{R_1\,V_2 + R_3\,V_1}{R_1 + R_3} \\ v_3 = V_2 \end{pmatrix}$$

```
circuit.numerical_node_voltages
```

```
ans =
```

$$\begin{pmatrix} v_1 = 28 \\ v_2 = \frac{56}{5} \\ v_3 = 7 \end{pmatrix}$$

```
56/5
```

```
ans = 11.2000
```

1. Open-circuit the load element.
2. Analyze the circuit. Find voltage across the open gap.
3. Short-circuit voltage sources and open-circuit current sources.
4. Simplify to single resistor.
5.

```
circuit = Circuit('circuits/thevenin.txt');
ELAB.thevenin(circuit, circuit.Resistors(2));
```

```
Symbolic analysis successful (0.248778 sec).

Numerical evaluation successful (0.0430036 sec).
```

```
circuit = Circuit('circuits/thevenin.txt');
circuit.list
```

```
ans =
    'V1 1 0 DC 28
     V2 3 0 DC 7
     R1 1 2 4
     R2 2 0 2
     R3 2 3 1
     '
```

```
ELAB.thevenin(circuit, circuit.Resistors(2));
```

```
Symbolic analysis successful (0.235355 sec).

Numerical evaluation successful (0.0373992 sec).
```

```
circuit.list
```

```
ans =
    'Req1 0 1 4/5
     '
```

```
ELAB.simplify(circuit);
circuit.list
```

```
ans =
    'Req1 0 1 4/5
     '
```

```
circuit.Resistors(1)
```

```
ans =
```

```
Resistor with properties:

     resistance: 4/5
      impedance: 4/5
          anode: 0
        cathode: 1
       v_across: []
      i_through: []
  num_terminals: 2
             id: 'Req1'
      terminals: [0 1]
```