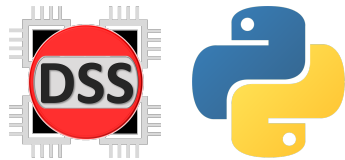# OpenDSS Control Using `py-dss-interface` Cheatsheet

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Compiling and Running a Model

1. Creating DSS Object

```python
import py_dss_interface
dss = py_dss_interface.DSS()
```

2. Compiling Circuit Model

```python
dss_file = "User to inform DSS file path"
dss.text(f"compile [{dss_file}]")
```

3. Running Simulations

```python
dss.text(f"compile [{dss_file}]")
dss.text("solve")
print(f"Solution converged: {dss.solution.converged}")
dss.text("show voltages")
```

Property Exploration

4. Exploring Circuit Properties

```python
dss.text(f"compile [{dss_file}]")
element_names = dss.circuit.elements_names
buses_names = dss.circuit.buses_names
num_buses = dss.circuit.num_buses
```

5. Exploring and Manipulating Element Properties

```python
dss.text(f"compile [{dss_file}]")

# Direct method
dss.lines.name = "L115"
dss.lines.length = 1000
new_length = dss.lines.length

# Using dss.text
dss.text("edit line.L115 length=1000")
new_length = dss.text("? line.L115.length")
```

6. Exploring and Manipulating Bus Properties

```python
dss.text(f"compile [{dss_file}]")
dss.circuit.set_active_bus("9")
bus_ln_kv = dss.bus.kv_base
dss.bus.x = 10
dss.bus.y = 10
```

Obtaining Simulation Results

7. Circuit Results

```python
dss.text(f"compile [{dss_file}]")
dss.text("solve")
total_power = dss.circuit.total_power
```

8. Element Results

```python
dss.text(f"compile [{dss_file}]")
dss.text("solve")
dss.circuit.set_active_element("Line.L115")
voltages = dss.cktelement.voltages_mag_ang
```

9. Bus Results

```python
dss.text(f"compile [{dss_file}]")
dss.text("solve")
dss.circuit.set_active_bus("149")
bus_voltages = dss.bus.vmag_angle
```

Algorithms and Automation

10. Looping Elements

```python
for line in dss.lines.names:
    dss.lines.name = line
    print(f"{dss.lines.name}: {dss.lines.length}")
    dss.circuit.set_active_element(f"line.{line}")
    print(f"Powers: {dss.cktelement.powers}")
```

11. Looping Simulations

```python
for load_mult in [1, 1.2, 1.4]:
    dss.text(f"compile [{dss_file}]")
    dss.text(f"set loadmult={load_mult}")
    dss.text("solve")
```

12. Find Furthest Bus

```python
for bus in dss.circuit.buses_names:
    dss.circuit.set_active_bus(bus)
    if len(dss.bus.nodes) >= 3:
        print(f"{bus}: {dss.bus.distance}")
```

13. Max Load Before Undervoltage

```python
while not under_voltage:
    load_mult = 1 + i / 100
    dss.text(f"set loadmult={load_mult}")
    dss.text("solve")
    if min(dss.circuit.buses_vmag_pu) < 0.95:
        under_voltage = True
```

Further Learning

Take Your Learning Further!

Learn how to automate, debug, and analyze OpenDSS simulations using Python.

https://www.pauloradatz.me/course-py-dss-interface