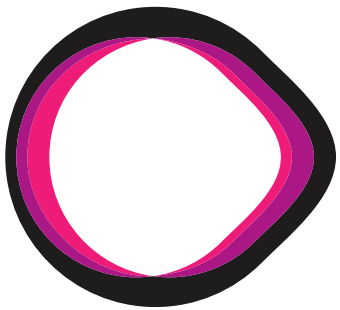
Python – Lektion 11
Pandas

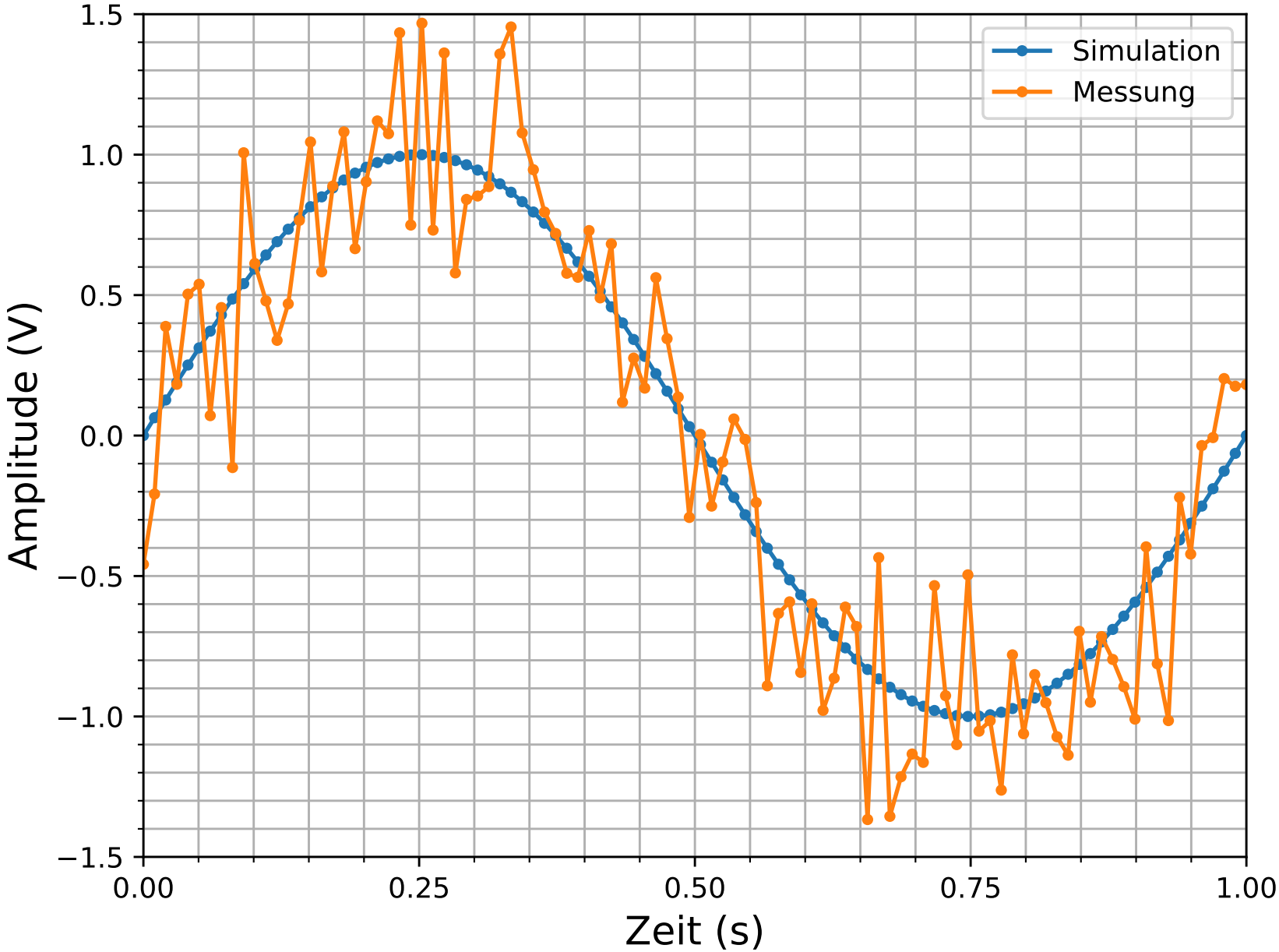


OST
Ostschweizer
Fachhochschule

Rückblick

- Matplotlib
  - Liniendiagramm
  - Linienformatierung
  - Achsenformatierung
  - Subplots
  - loglog
- NumPy III
  - Datendateien

Rückblick Matplotlib



Rückblick Matplotlib

```
import matplotlib.pyplot as plt


plt.figure(constrained_layout=True)
plt.plot(t, s1, ".-", label="Simulation")
plt.plot(t, s2, ".-", label="Messung")
plt.xlabel("Zeit (s)", fontsize=14)
plt.ylabel("Amplitude (V)", fontsize=14)
plt.xlim(0, 1)
plt.ylim(-1.5, 1.5)
plt.xticks([0, 0.25, 0.5, 0.75, 1])
plt.yticks([-1.5, -1, -0.5, 0, 0.5, 1,  1.5])
plt.grid(which="both")
plt.minorticks_on()
plt.legend()
plt.savefig("diagramm_nOOP.pdf")
```

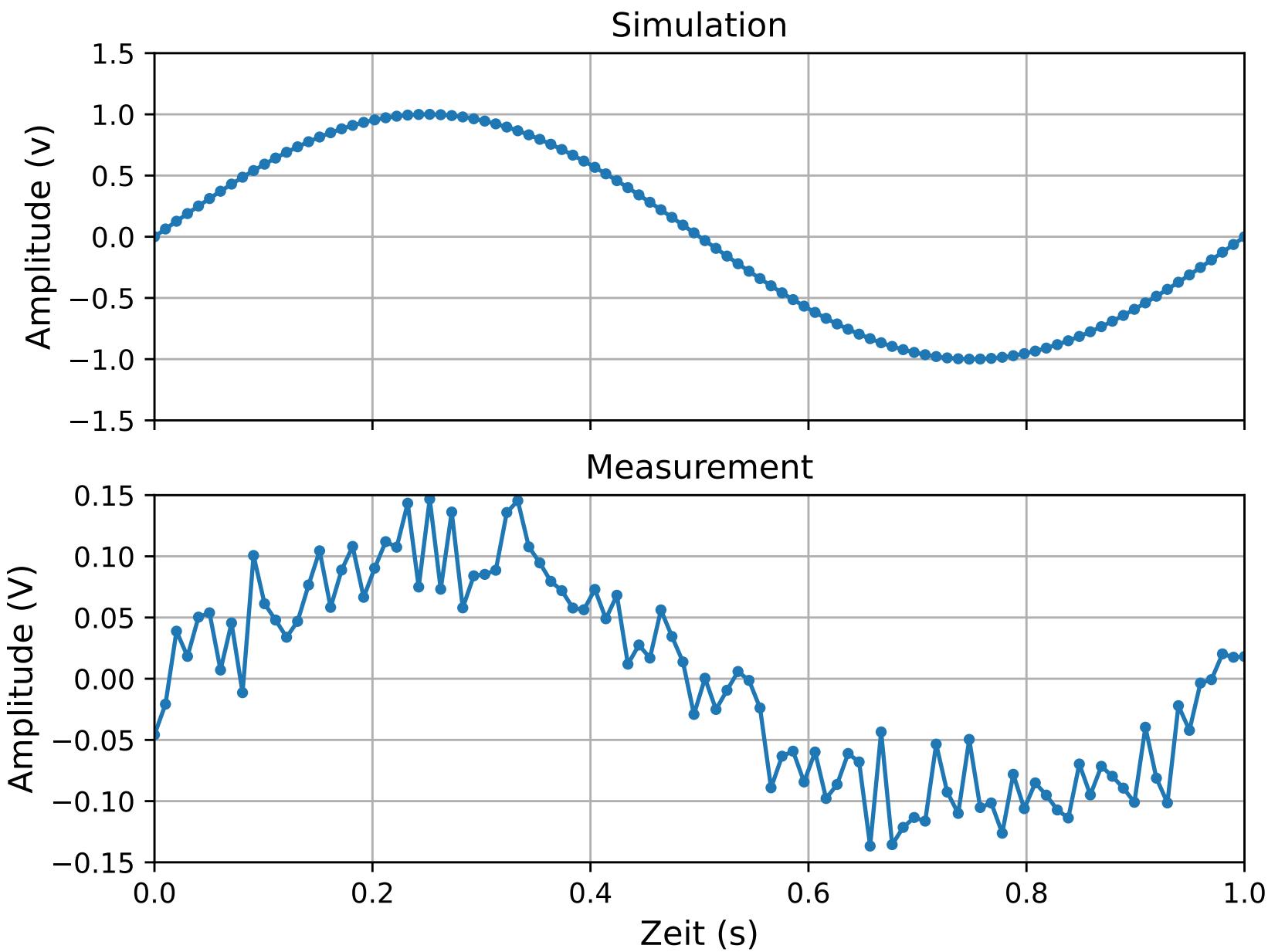
Rückblick Matplotlib

```
import matplotlib.pyplot as plt


fig, ax = plt.subplots(constrained_layout=True)
ax.plot(t, s1, ".-", label="Simulation")
ax.plot(t, s2, ".-", label="Messung")
ax.set_xlabel("Zeit (s)", fontsize=14)
ax.set_ylabel("Amplitude (V)", fontsize=14)
ax.set_xlim(0, 1)
ax.set_ylim(-1.5, 1.5)
ax.set_xticks([0, 0.25, 0.5, 0.75, 1])
ax.set_yticks([-1.5, -1, -0.5, 0, 0.5, 1,  1.5])
ax.grid(which="both")
ax.minorticks_on()
ax.legend()
fig.savefig("diagramm_OOP.pdf")
```

Rückblick Matplotlib

```
import matplotlib.pyplot as plt

fig = plt.figure(constrained_layout=True)
ax = fig.add_subplot()
ax.plot(t, s1, ".-", label="Simulation")
ax.plot(t, s2, ".-", label="Messung")
ax.set_xlabel("Zeit (s)", fontsize=14)
ax.set_ylabel("Amplitude (V)", fontsize=14)
ax.set_xlim(0, 1)
ax.set_ylim(-1.5, 1.5)
ax.set_xticks([0, 0.25, 0.5, 0.75, 1])
ax.set_yticks([-1.5, -1, -0.5, 0, 0.5, 1,  1.5])
ax.grid(which="both")
ax.minorticks_on()
ax.legend()
fig.savefig("diagramm_OOP.pdf")
```

Rückblick Matplotlib



Rückblick Matplotlib

```
import matplotlib.pyplot as plt

fig, (ax1,ax2) = plt.subplots(nrows=2, ncols=1,
                              sharex=True)

ax1.plot(t, s1, ".-")
ax2.plot(t, s2, ".-")
ax1.set_ylabel("Amplitude (v)", fontsize=12)
ax2.set_xlabel("Zeit (s)", fontsize=12)
ax2.set_ylabel("Amplitude (V)", fontsize=12)
ax1.set_title("Simulation")
ax2.set_title("Measurement")
ax1.grid(True)
ax2.grid(True)
fig.savefig("diagramm_subplots.pdf")
```

Rückblick Matplotlib

```
import matplotlib.pyplot as plt

fig = plt.figure(constrained_layout=True)
ax1 = fig.add_subplot(2, 1, 1)
ax2 = fig.add_subplot(2, 1, 2, sharex=ax1)
ax1.plot(t, s1, ".-")
ax2.plot(t, s2, ".-")
ax1.set_ylabel("Amplitude (v)", fontsize=12)
ax2.set_xlabel("Zeit (s)", fontsize=12)
ax2.set_ylabel("Amplitude (V)", fontsize=12)
ax1.set_title("Simulation")
ax2.set_title("Measurement")
ax1.grid(True)
ax2.grid(True)
fig.savefig("diagramm_subplots.pdf")
```

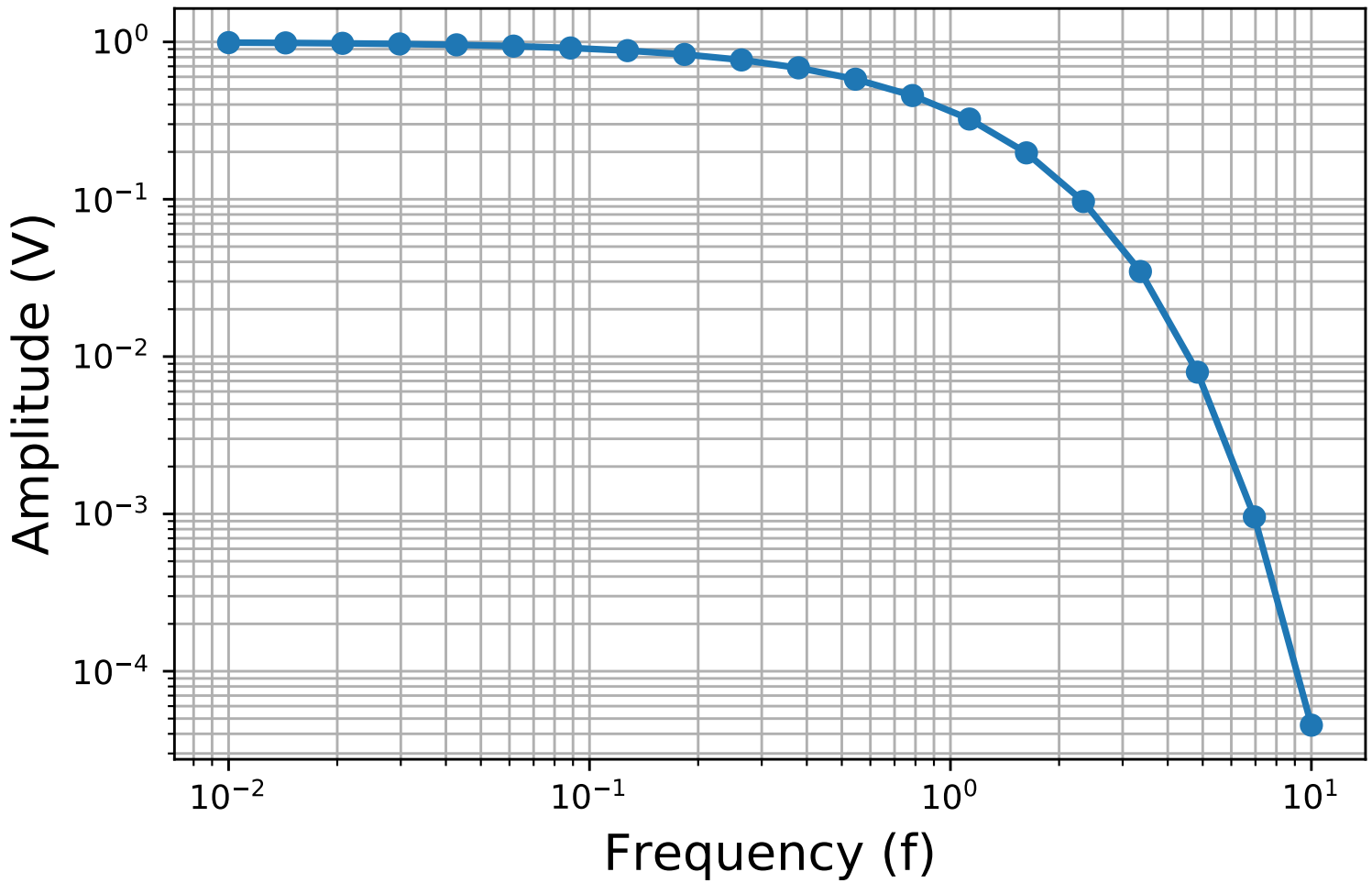
Rückblick Matplotlib

```
import matplotlib.pyplot as plt

fig, ax = plt.subplots(nrows=2, ncols=1,
                       sharex=True)

ax[0].plot(t, s1, ".-")
ax[1].plot(t, s2, ".-")
ax[0].set_ylabel("Amplitude (v)", fontsize=12)
ax[1].set_xlabel("Zeit (s)", fontsize=12)
ax[1].set_ylabel("Amplitude (V)", fontsize=12)
ax[0].set_title("Simulation")
ax[1].set_title("Measurement")
ax[0].grid(True)
ax[1].grid(True)
fig.savefig("diagramm_subplots.pdf")
```

Rückblick Matplotlib

Loglog Plot

```
ax.loglog(f, s, "-o", linewidth=2)
```



Rückblick NumPy

- Datendatei schreiben

```
x = np.arange(10).reshape(2, 5)
np.savetxt("my_data3.txt", x, fmt="%02d", delimiter=",")
```

- Datendatei lesen

```
y = np.loadtxt("my_data3.txt", delimiter=",")
print(y)
[[0. 1. 2. 3. 4.]
[5. 6. 7. 8. 9.]]
```

- Nur spezifische Spalten lesen

```
y = np.loadtxt("my_data3.txt", delimiter=",",
    usecols=(0,2,4))
print(y)
[[0. 2. 4.]
[5. 7. 9.]]
```

- Spalten aus dem File direkt in Zeilenvektoren speichern:

```
y1, y2, y3 = np.loadtxt("my_data3.txt", delimiter=",",
    usecols=(0,2,4), unpack=True)
```

Was ist Pandas?

- Python-Bibliothek

  ```
  import pandas as pd
  ```

- **Pan**el **Da**ta

- Python Bibliothek zur Datenanalyse- und manipulation
  - Einfache Darstellung von Daten
  - Methoden für die einfache Weiterverarbeitung von Daten
  - Effizienter Umgang mit grossen Datensätzen

    `http://localhost:8888/notebooks/pandas.ipynb`