

SIGNAL PROCESSING IN MNE: DAY 3

2 – SPECTRAL CONNECTIVITY THE MNE-CONNECTIVITY PACKAGE



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Brain and
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Forms of connectivity

Structural connectivity

- Physical connections between brain regions, e.g. DWI

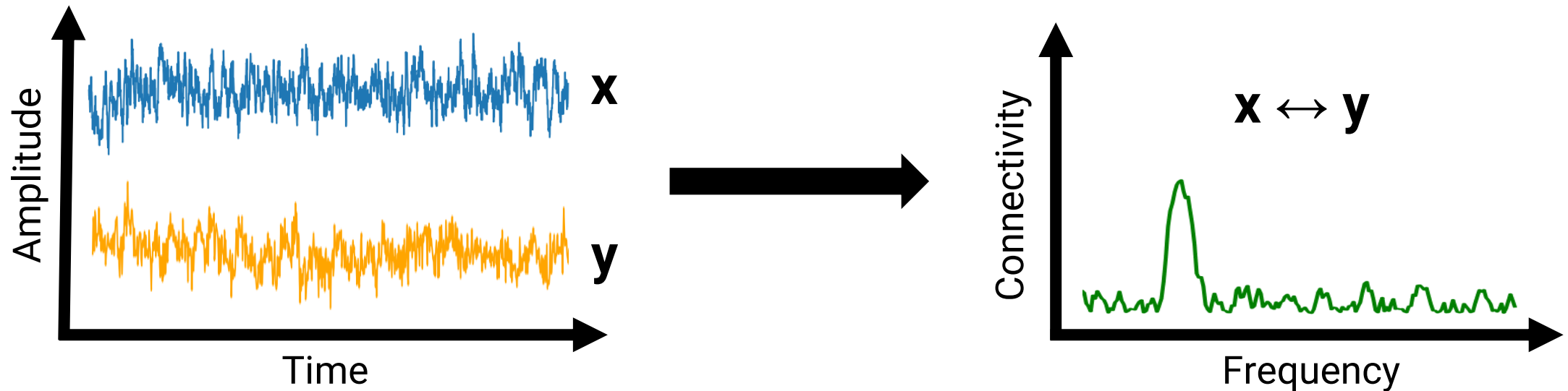
Functional connectivity

- Neuronal activity across brain regions, e.g. fMRI

Spectral (effective) connectivity

- Frequency-resolved relationship between signals
- Undirected vs. directed

Spectral connectivity



E.g. Coherency

- Undirected
- Correlation in the frequency domain








Pearson correlation $r = \frac{cov(x, y)}{\sigma_x \sigma_y}$

Coherency
$$C_{xy}(f) = \frac{S_{xy}(f)}{\sqrt{S_{xx}(f)S_{yy}(f)}}$$

Spectral connectivity

MNE-Connectivity 0.6.0 documentation [What's new?](#) [Installation](#) [API](#) [Examples](#)

Search Ctrl + K

 unit_tests **passing**  circleci **passing**  Azure Pipelines **succeeded**  codecov **89%**  PyPI downloads **5.7k/month**  pypi **v0.6.0**
 Conda downloads **8.1k**

MNE-Connectivity

[MNE-Connectivity](#) is an open-source Python package for connectivity and related measures of MEG, EEG, or iEEG data built on top of the [MNE-Python](#) API. It includes modules for data input/output, visualization, common connectivity analysis, and post-hoc statistics and processing.

[What's new?](#)

[Installation](#)

[API](#)

[Examples](#)

[Dynamic Connectivity Examples](#)

Onto the notebook...

Conclusion

- Tools for computing spectral connectivity in the `mne-connectivity` package

```
spectral_connectivity_epochs()
```

```
spectral_connectivity_time()
```

- Various connectivity methods supported
- Can be computed from `Epochs/EpochsArray` objects and data arrays