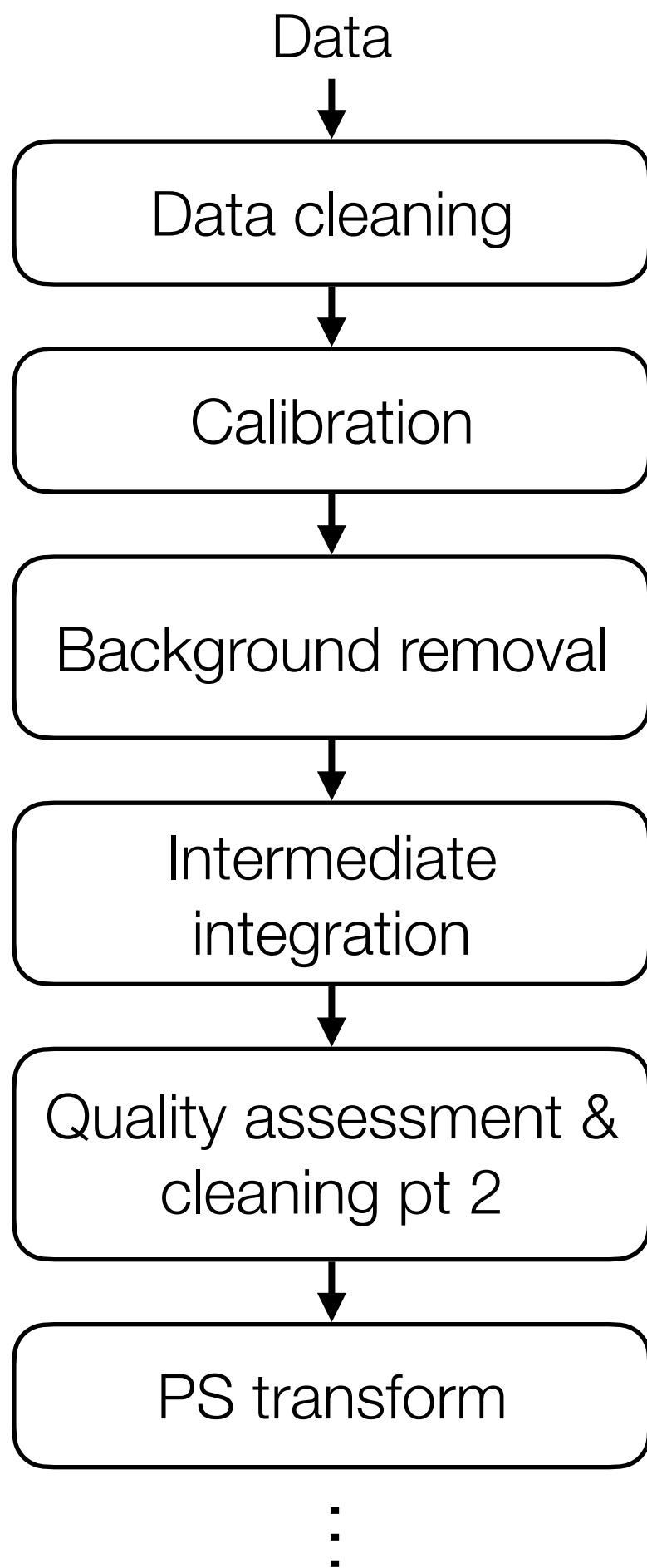


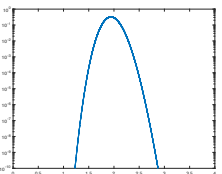
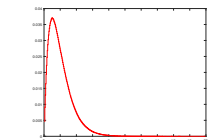
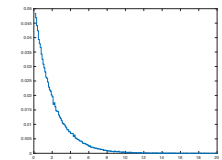
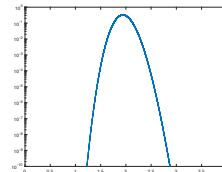
Class 7: Analysis plan & final project

Miguel F. Morales

Bryna Hazelton



Error Model



⋮

Worries

Thunder storms

Biasing result

Temperature
dep. offset

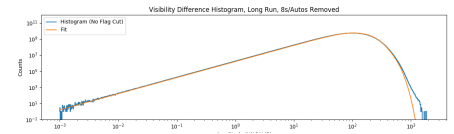
Signal leakage

⋮

Tests



Jackknife



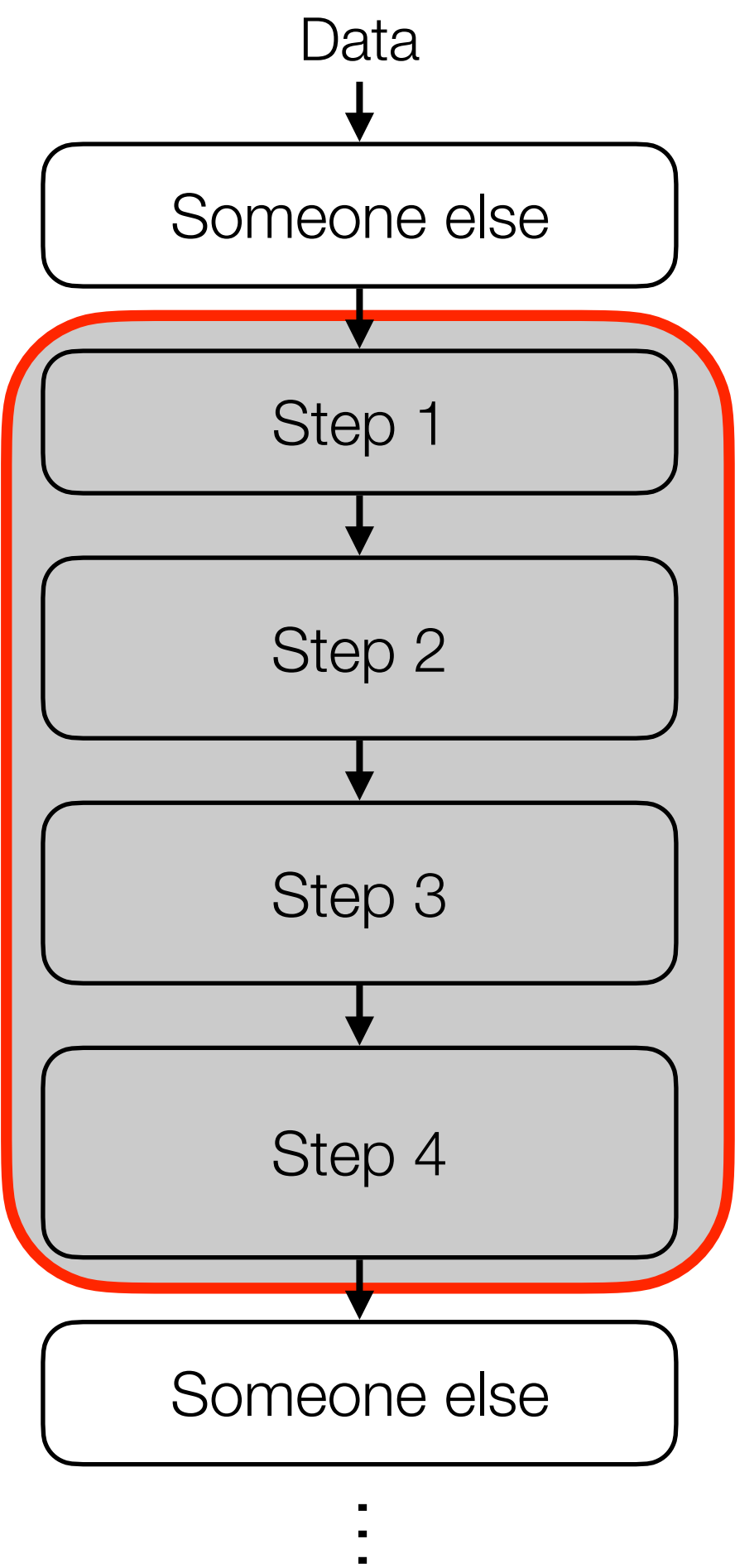
Correlation

Injection test

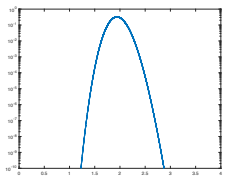
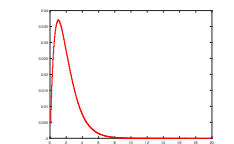
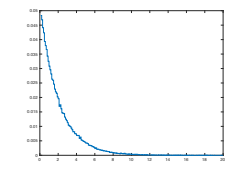
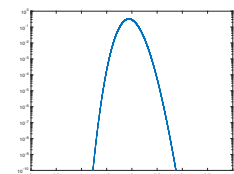
⋮

Questions

- Big questions: what you want to know in the end
- Little questions: what should data look like at each step
- Worries: Concerns about the analysis as a whole, but best answered with well understood intermediate products.



**Error
Model**



⋮

Worries

Thunder storms

Biasing result

Temperature
dep. offset

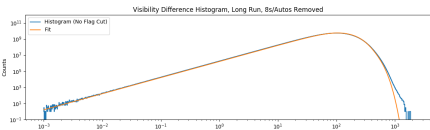
Signal leakage

⋮

Tests



Jackknife



Correlation

Injection test

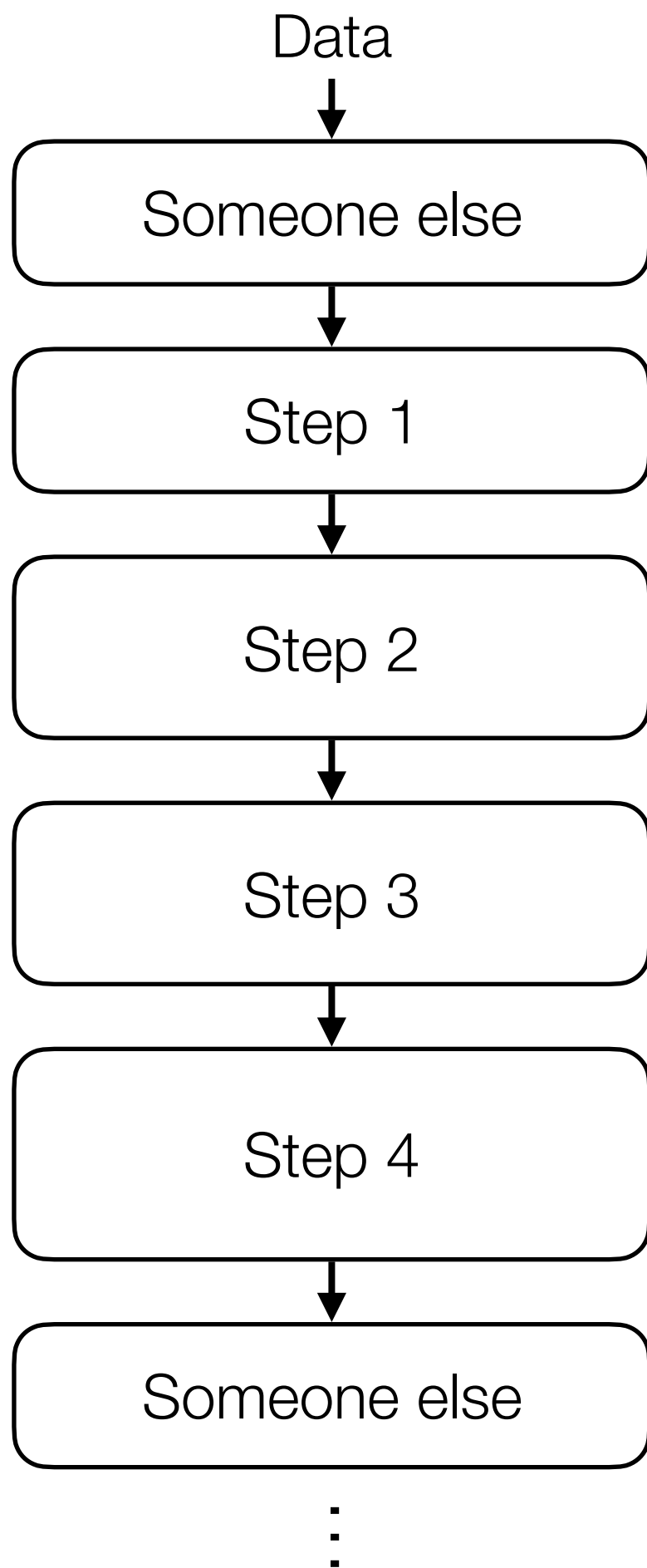
⋮

Little steps

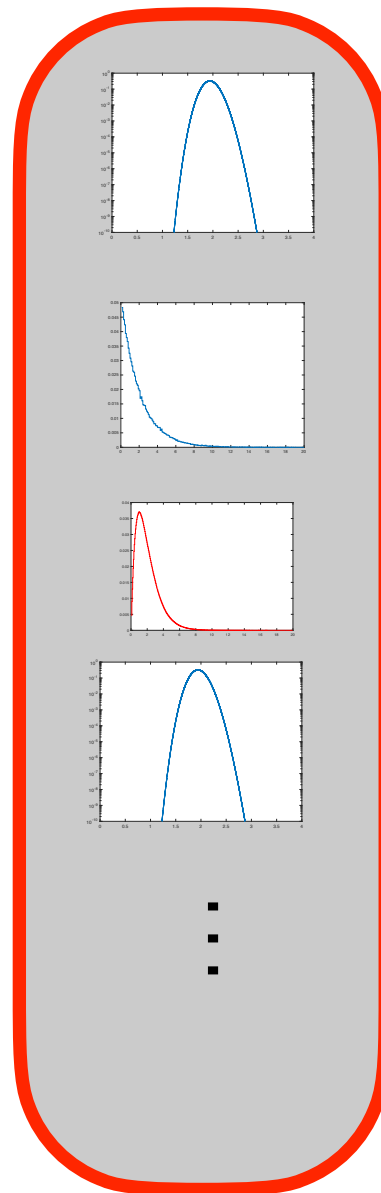
Break your analysis problem into a few simple steps.

Examples:

- Filtering data in a specific way (throw outliers on metric A)
- Transforming the data (e.g. averaging, taking a Fourier Transform)
- A calibration step
- Determining or transforming units (e.g. millivolts to keV).



Error Model



Worries

Thunder storms

Biasing result

Temperature
dep. offset

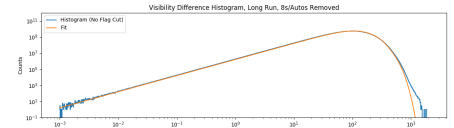
Signal leakage

⋮

Tests



Jackknife



Correlation

Injection test

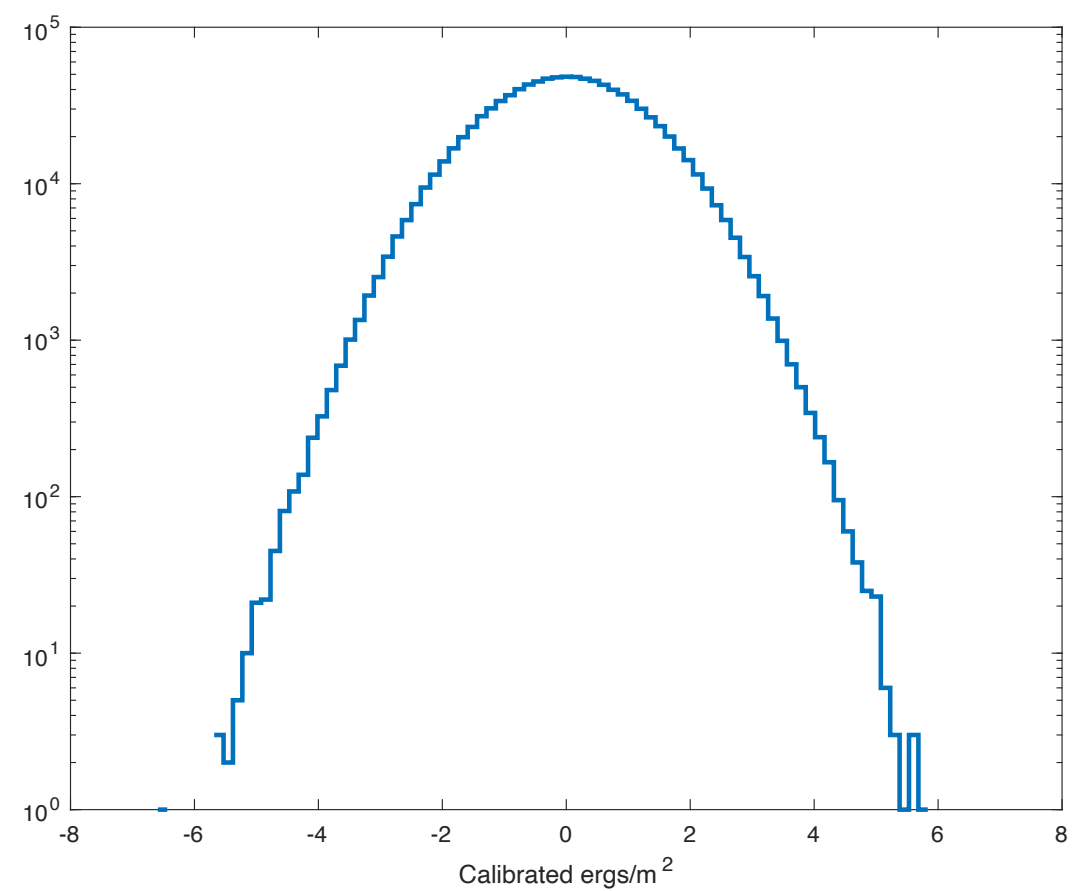
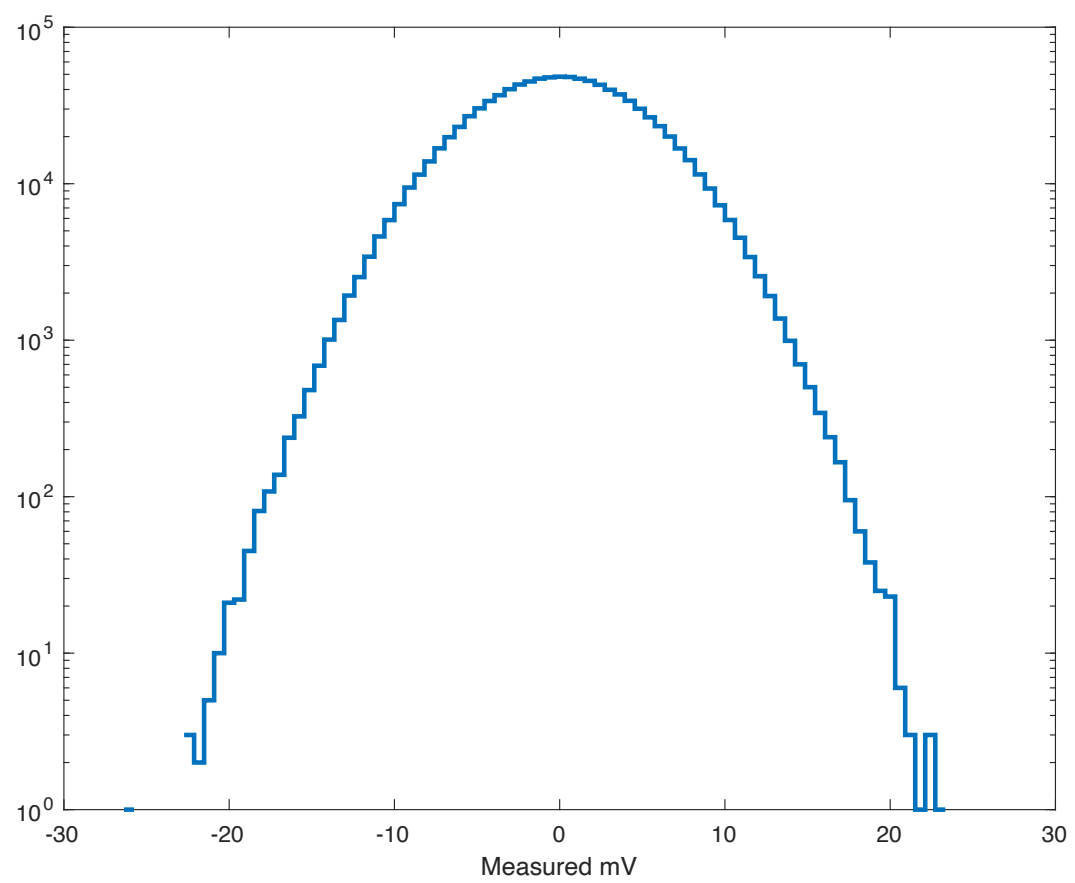
⋮

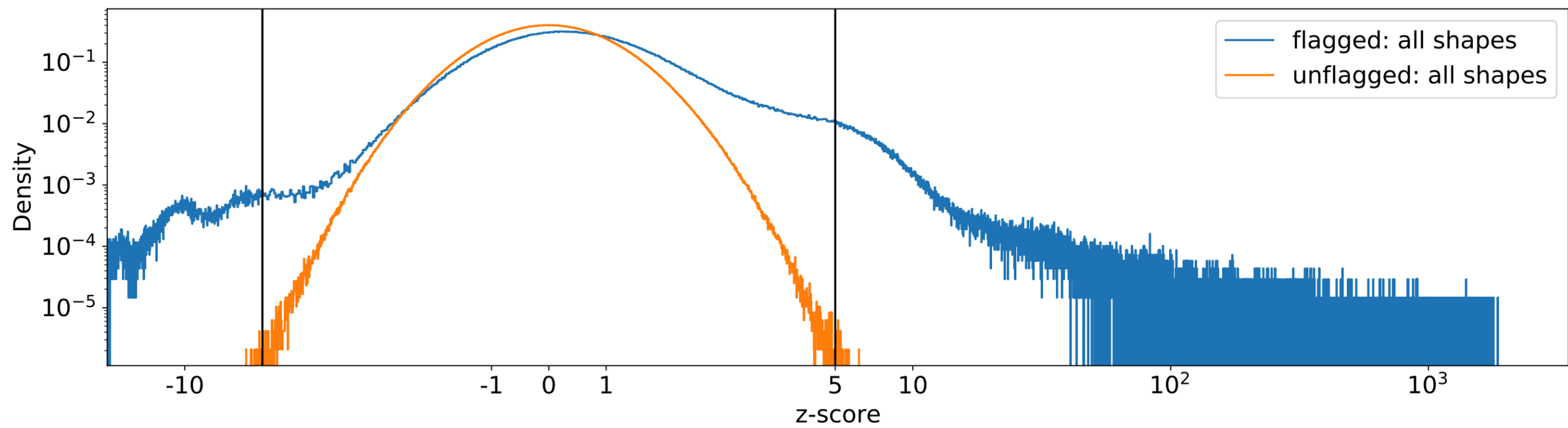
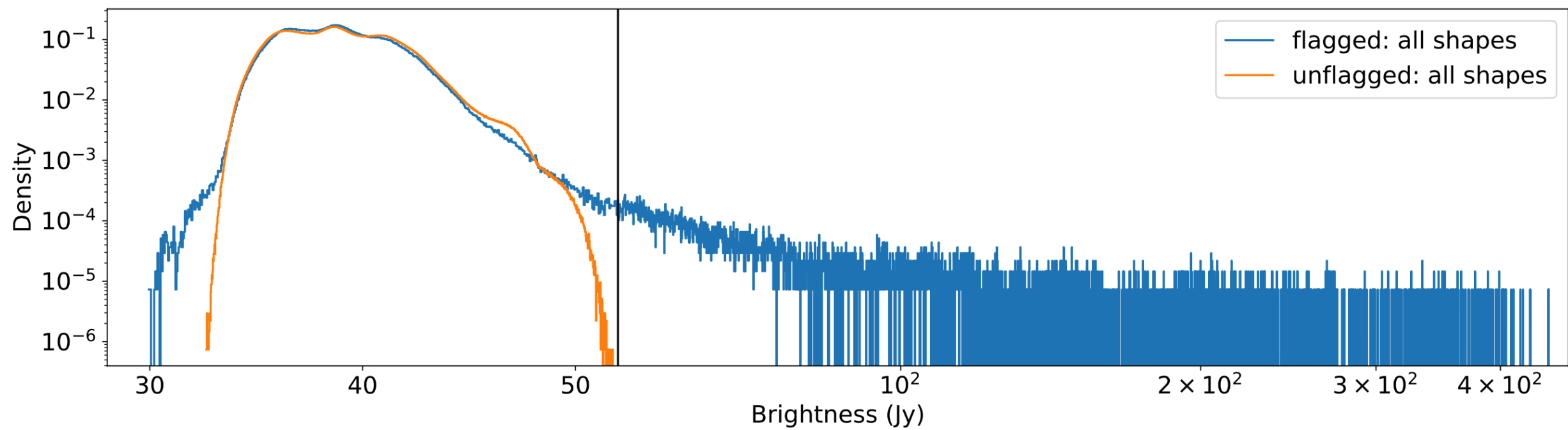
Predict background at each step

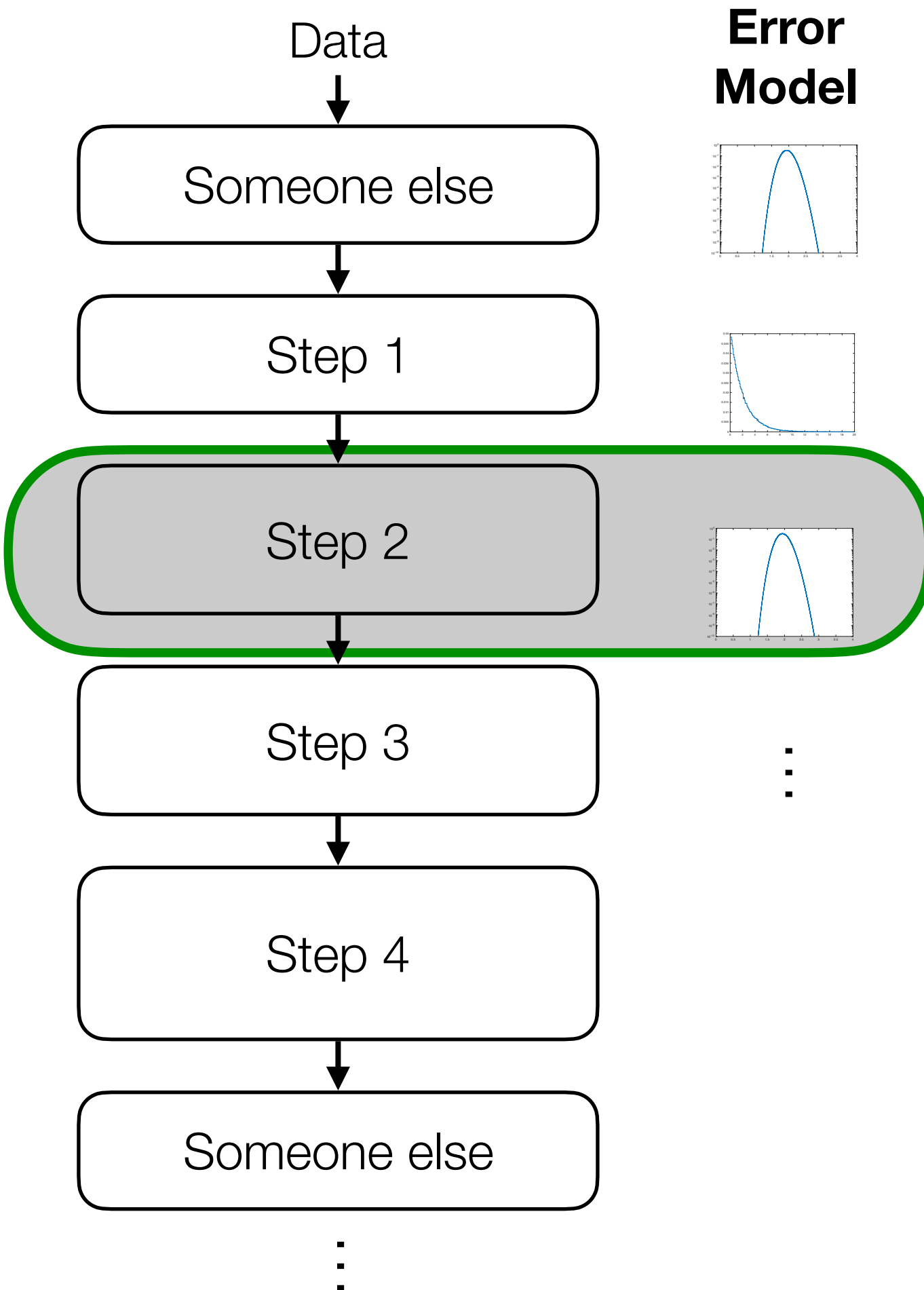
Examples:

- Unit or axis change (mV->keV, or uncalibrated to calibrated)
- Filtering or removal of outliers (data quality cuts)
- A mathematical transformation (average, square, Fourier Transform).

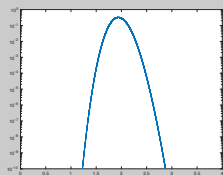
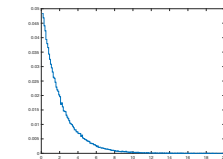
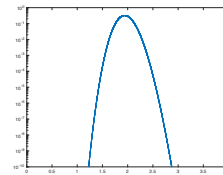
Can be placeholders but think about the background and how it changes.







Error Model



⋮

Worries

Thunder storms

Biasing result

Temperature
dep. offset

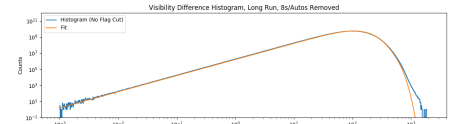
Signal leakage

⋮

Tests



Jackknife



Correlation

Injection test

⋮

Data



Someone else



Step 1



Step 2



Step 3



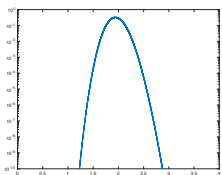
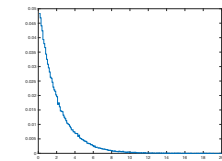
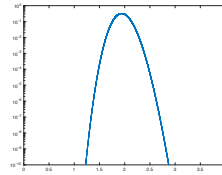
Step 4



Someone else

⋮

Error Model



⋮

Worries

Temperature
dep. offset

⋮

Tests



Correlation

⋮

Develop a list of worries & tests

Make a list of worries

- Take your time, creative & concrete both useful

Develop a test for each

- jackknife, specific plot, or statistical test

Link to analysis step(s) where test is best performed

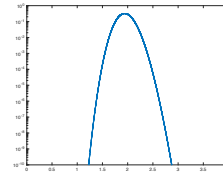
Data

**Error
Model**

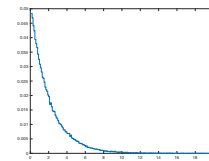
Worries

Tests

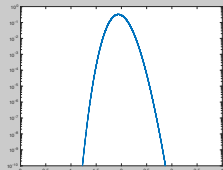
Someone else



Step 1



Step 2



Temperature
dep. offset



Correlation

Step 3

⋮

⋮

⋮

Step 4

Someone else

⋮

Organize

GitHub issues are great here

- Self-contained analysis steps & code
- Linking of tests to specific analysis & testing code
- Documenting progress on worries (memos also great)
- Checking off of worries (closing issues)
- Ties in with more advanced techniques, e.g. provenance

**DON'T
PANIC!**

Your assignment

- Design an analysis chain
 - Break into small steps
 - Predict background at each step
- Make a list of worries
 - Develop a jackknife or test for each worry
 - Determine at which step(s) the test is best done
- Organize your work, preferably in GitHub
- Describe which parts of your mini-analysis to implement for final project

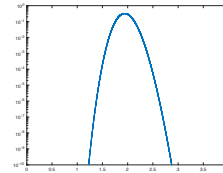
Data

**Error
Model**

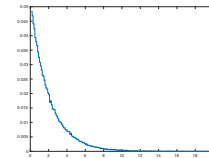
Worries

Tests

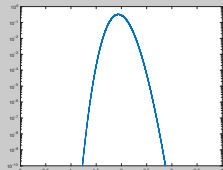
Someone else



Step 1



Step 2



Temperature
dep. offset



Correlation

Step 3

⋮

⋮

⋮

Step 4

Someone else

⋮