

Gaussian model for SVD

Use a Gaussian model to create a mock data set

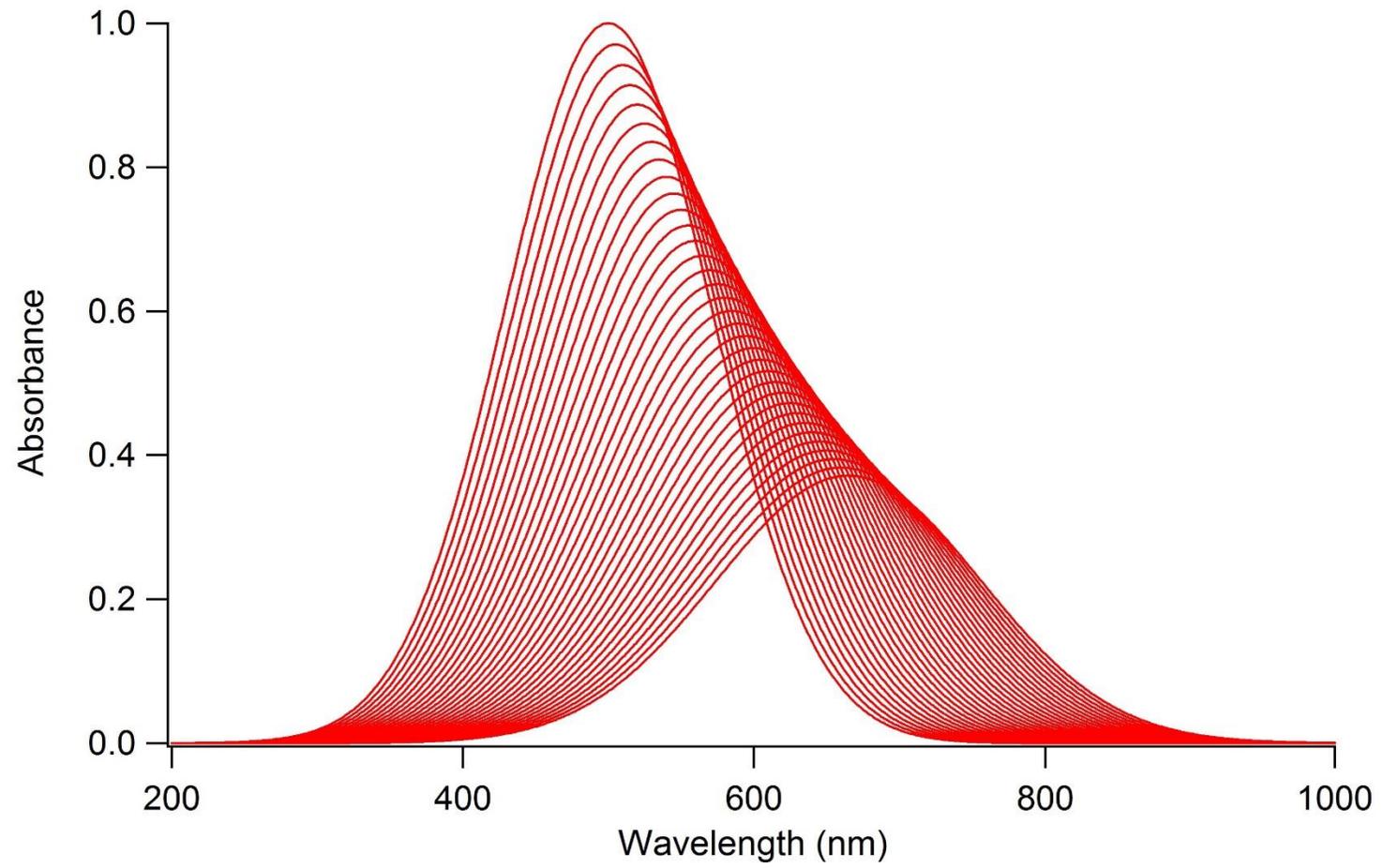
Mimic and absorption spectrum vs. time

Perform SVD and look at the components

This demonstration of SVD is based on a mock data set. The data here is intended to represent absorbance vs. time at a range of wavelengths from 200 – 1000 nm. The spectrum is a perfect Gaussian with no noise. This makes it quite easy to see how the SVD components relate to the time dependence. The absorption band is decreasing in intensity exponentially with a time constant of roughly 30 seconds. The band is shifting about 1% each second and it is broadening about 2% each second. These are three independent changes in the data, which are occurring on different time scales. If any of these changes happened to occur with the same time profile then they would be in the same SVD component. However, since there are three different things we expect 3 significant SVD components.

W =

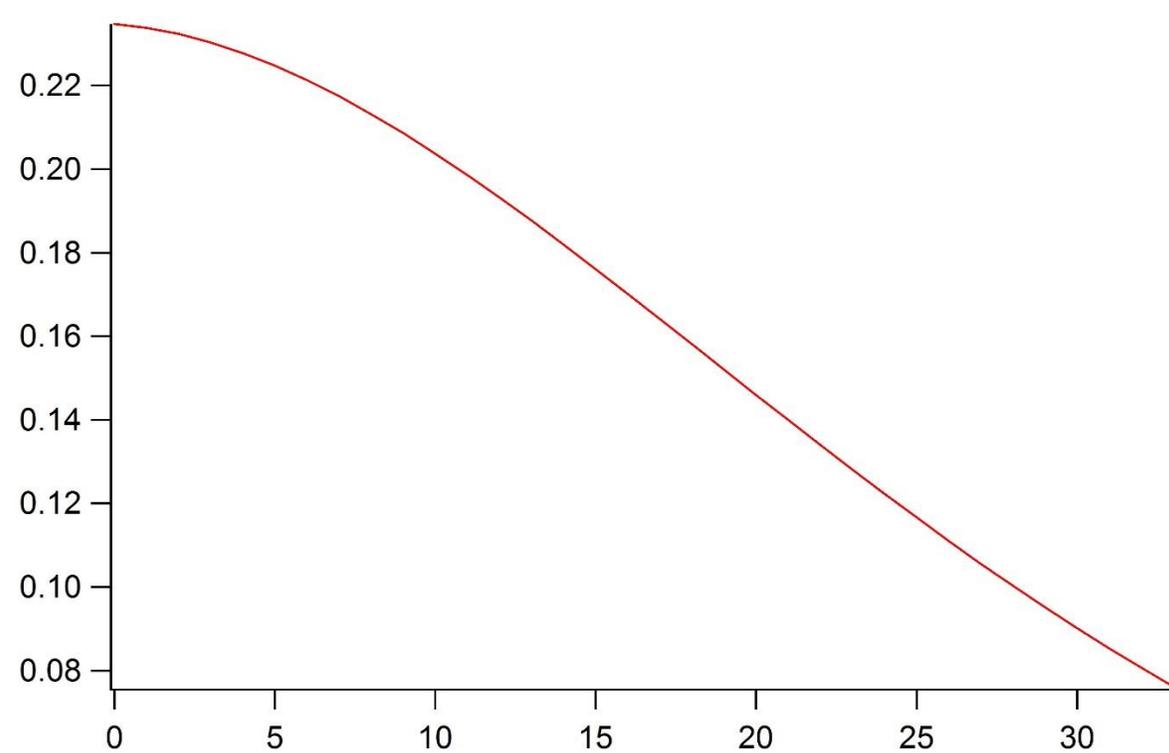
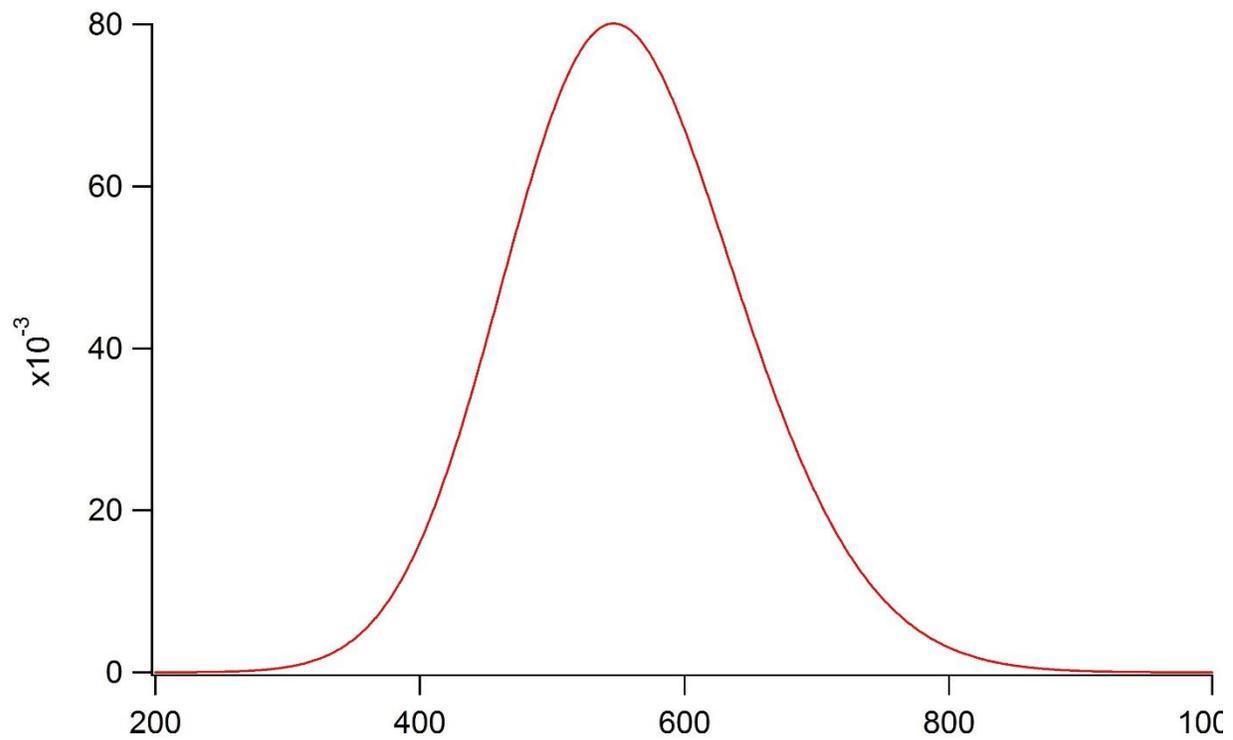
42.3862
15.7198
4.41718
1.00687
0.200132
0.0359939
0.00597925
0.000928838
0.000135691
1.88366e-05
1.16057e-05



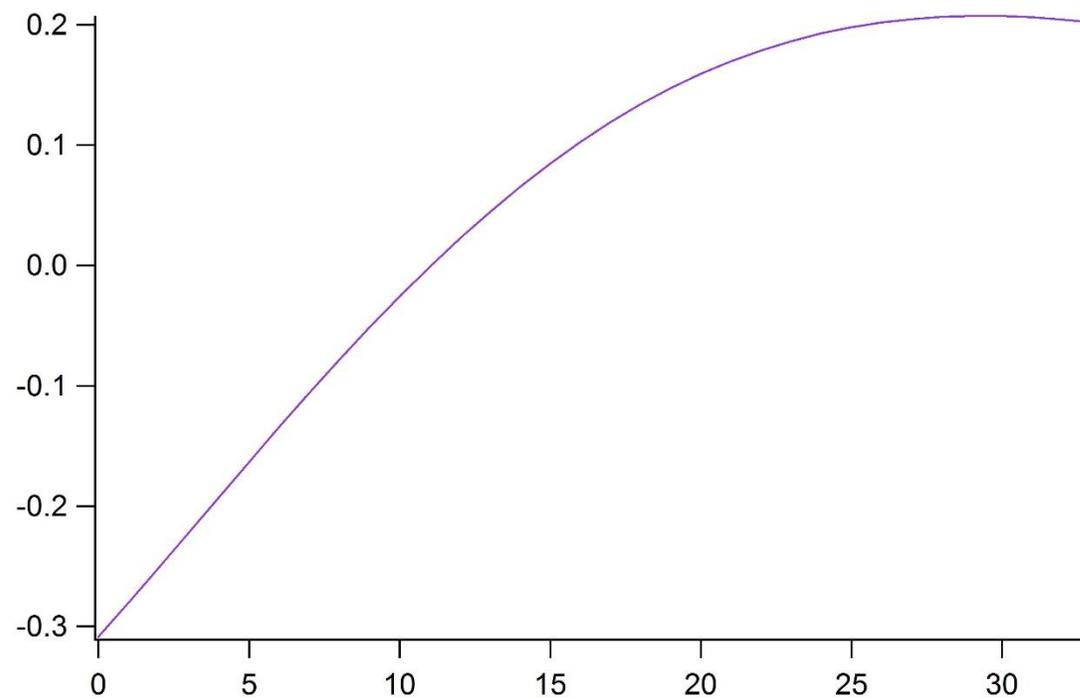
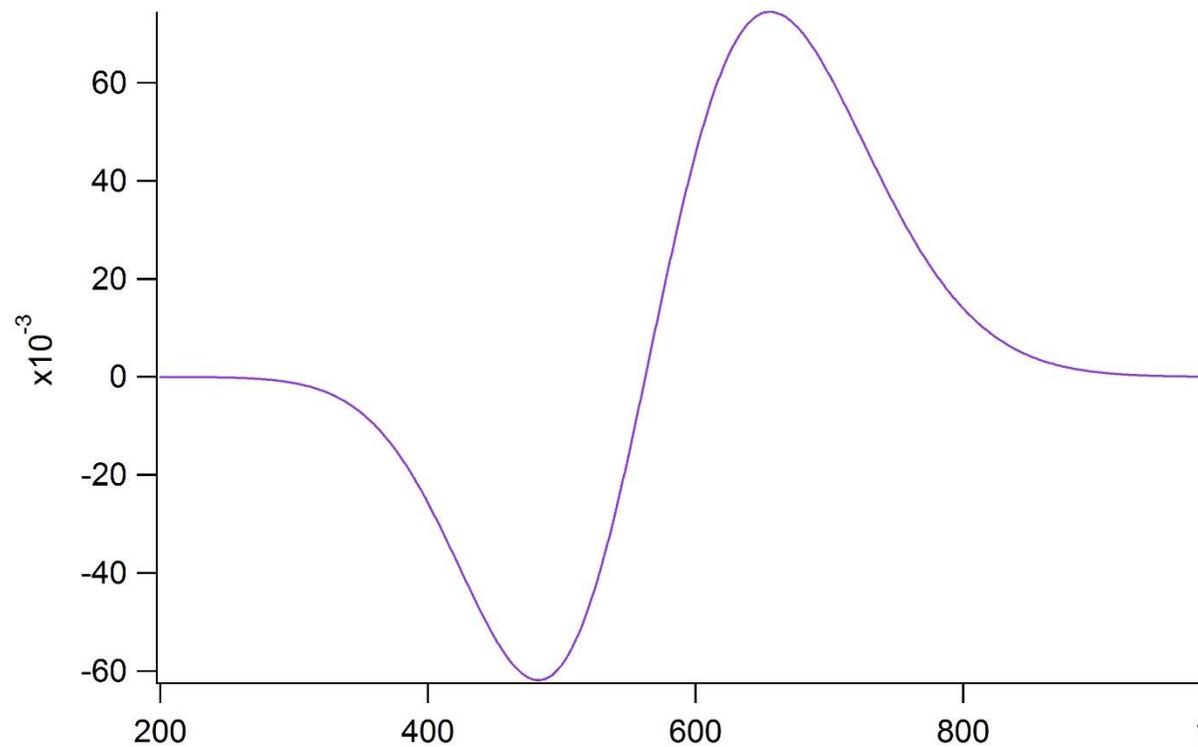
Next we examine the basis spectra in the U matrix and the corresponding time courses in the V^T matrix. These are plotted side by side.

We will only examine the first 3 components since these contain more than 99% of the information content of the data (according to the W matrix).

U_1 and V_1^T



U_2 and V_2^T



U_3 and V_3^T

