Part 2 Exercise 1

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First, we generated the three time-series. We generated 300 points for each and used gaussian noise with a standard deviation of 1. We generated a random 3x3 matrix with values between 0 and 1. Now we transformed the data with PCA and ICA and evaluated them with different measurements and by plotting them. For the measurements we used trustworthiness, continuity and LCMC.

We will describe the three measurement methods:

Trustworthiness: Faraway vectors that become neighbors in embedding decrease trustworthiness.

Continuity: Vectors that are neighbors but are embedded far away decrease the continuity.

LCMC: The LCMC quantifies the true positives.

We have observed, that the PCA does a significantly better job in this case. For all three measurements the PCA performs much better than the ICA.

Looking at the signal outputs supports these observations. While both methods don't perfectly sperate the sources PCA works much better. It extracts the basic form for every function pretty good, in ICA 2 signals fit pretty good, but the third is very different compared to the source function.

Overall, we can say that in this specific case PCA performed much better than ICA.