

These codes estimate the uncertainty of individual end-member (source) contributions to streams (mixture) based on a multi-tracer set in a three-dimensional space.

The method.m code shows step-by-step calculations of partial derivatives, degrees of freedom, t-Student and confidence interval limits for each source fraction.

method.m uses the functions Yx.m and dYzdyx.m for its execution.

A, B, C and D represent the set of sources and M the mixture.

Please refer to Correa et al., (2019) in Correa, A., Ochoa-Tocachi, D. and Birkel, C.: Technical note: Uncertainty in multi-source partitioning using large tracer data sets, Hydrology and Earth System Sciences Discussions, 1–14, doi:<https://doi.org/10.5194/hess-2019-197>, 2019 for a very detailed description of the used notation, equations and variables for this example.

The equation numbers used in the code method.m refer to the corresponding ones in Correa et al., (2019).

Instructions:

Enter data for the median of end-members and mixture, their standard deviations and sample size, all projected in the three-dimensional PCA-space (U-space in the referred Technical Note). The file must be named data.csv and follows an order similar to the one presented in this example:

	Median in U1	Median in U2	Median in U3	Stvd in U1	Stvd in U2	Stvd in U3	No. samples	No. samples	No. samples
A	26.25	7.29	7.00	0.46	0.36	0.40	25	25	25
B	0.23	5.47	1.98	0.85	1.29	0.69	33	33	33
C	-2.24	-3.93	3.74	0.55	0.58	0.45	37	37	37
D	-5.38	-6.10	-4.85	0.27	0.56	0.15	36	36	36
M	-0.61	-1.04	0.94	2.07	1.10	0.66	257	257	257

Please do not include rows and column names in the data.csv file, here is used for merely visual purposes of the example.

Run the method.m code.

It is recommended to keep all files in a common directory (method.m; dYzdyx.m; Yx.m and data.csv).

After executing the code, the fractions of the contribution of each end member to the mixture are calculated, as well as the degrees of freedom and upper and lower limits of uncertainties associated with their contribution.

Note: the order of the inputs (end members) is reflected in the outputs (fractions of contribution and uncertainties)