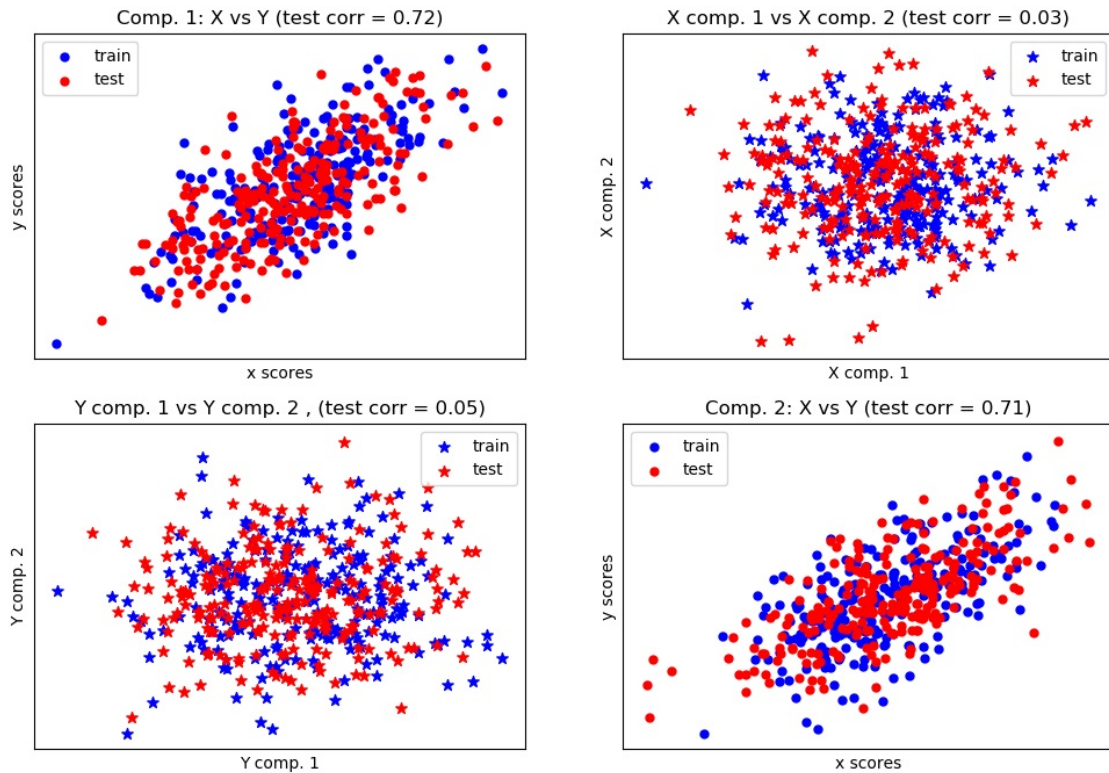# 1.8. Cross decomposition

The cross decomposition module contains two main families of algorithms: the partial least squares (PLS) and the canonical correlation analysis (CCA).

These families of algorithms are useful to find linear relations between two multivariate datasets: the `X` and `Y` arguments of the `fit` method are 2D arrays.

Cross decomposition algorithms find the fundamental relations between two matrices (X and Y). They are latent variable approaches to modeling the covariance structures in these two spaces. They will try to find the multidimensional direction in the X space that explains the maximum multidimensional variance direction in the Y space. PLS-regression is particularly suited when the matrix of predictors has more variables than observations, and when there is multicollinearity among X values. By contrast, standard regression will fail in these cases.

Classes included in this module are `PLSRegression` `PLSCanonical`, `CCA` and `PLSSVD`

Reference:
* JA Wegelin A survey of Partial Least Squares (PLS) methods, with emphasis on the two-block case

Examples:
* Compare cross decomposition methods

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