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David W. Roberts. 2008. Statistical analysis of multidimensional fuzzy set ordinations. *Ecology* 89:1246-1260.

A one-dimensional FSO is defined through a series of operations on intermediate sets. Given a vector of environmental data X , the first fuzzy set (A) is simply the relativized value of the vector X .

$$\forall x \in X \quad \mu_A(x) = \frac{x - \min(x)}{\max(x) - \min(x)} \quad [A.1]$$

The second fuzzy set (B) is the complement of the first

$$\forall x \in X \quad \mu_B(x) = 1 - \mu_A(x) \quad [A.2]$$

The third fuzzy set (C) is the set of plots similar to plots with high values of X

$$\mu_C(x) = \frac{\sum_{y \neq x} [S_{xy}(\mu_A(y))]}{\sum_{y \neq x} (\mu_A(y))} \quad [A.3]$$

where S_{xy} is the similarity of samples x and y . Fuzzy set D is the set of samples similar to samples with low values of X

$$\mu_D(x) = \frac{\sum_{y \neq x} [S_{xy}(\mu_B(y))]}{\sum_{y \neq x} (\mu_B(y))} \quad [A.4]$$

Fuzzy set E , the fuzzy set actually plotted in the FSO, is calculated as the anticommutative difference of C and D

$$\mu_E(x) = [1 + \mu_{\bar{D}}(x)^2 - \mu_{\bar{C}}(x)^2]/2 \quad [A.5]$$

where $\mu_{\bar{C}}(x) = 1 - \mu_C(x)$.