skfda.datasets.make_multimodal_samples

skfda.datasets.make_multimodal_samples(*n_samples: int = 15, *, n_modes: int = 1, points_per_dim: int = 100, ndim_domain: int = 1, ndim_image: int = 1, start: float = -1, stop: float = 1.0, std: float = 0.05, mode_std: float = 0.02, noise: float = 0.0, modes_location=None, random_state=None*)
[source]

Generate multimodal samples.

Each sample $x_i(t)$ is proportional to a gaussian mixture, generated as the sum of multiple pdf of multivariate normal distributions with different means.

$$x_i(t) \propto \sum_{n=1}^{\text{n\_modes}} \exp\left(-\frac{1}{2\sigma}(t-\mu_n)^T \mathbb{1}(t-\mu_n)\right)$$

Where $\mu_n = \text{mode\_location}_n + \epsilon$ and ϵ is normally distributed, with mean $\mathbb{0}$ and standard deviation given by the parameter *std*.

Parameters:

- **n_samples** – Total number of samples.
- **n_modes** – Number of modes of each sample.
- **points_per_dim** – Points per sample. If the object is multidimensional indicates the number of points for each dimension in the domain. The sample will have :math: *text{points_per_dim}^text{ndim_domain}* points of discretization.
- **ndim_domain** – Number of dimensions of the domain.
- **ndim_image** – Number of dimensions of the image
- **start** – Starting point of the samples. In multidimensional objects the starting point of each axis.
- **stop** – Ending point of the samples. In multidimensional objects the ending point of each axis.
- **std** – Standard deviation of the variation of the modes location.
- **mode_std** – Standard deviation σ of each mode.
- **noise** – Standard deviation of Gaussian noise added to the data.
- **modes_location** – List of coordinates of each mode.
- **random_state** – Random state.

Returns: `FDataGrid` object comprising all the samples.